The Builder.

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Dry Rot in Timber.—1. *Origin and Cause.*

SOME progress has been made in recent years in the application of scientific knowledge to the prevention of the decay of building materials, but the destruction of timber attacked by dry rot still continues to be a frequent source of trouble to builders and householders. It has long been known that dry rot is caused by the growth of a fungus known as *merulius lachrymans* upon the timber, that the fungus is propagated by spores, and that (though oddly called "dry" rot) it can live only in the presence of moisture; but further information is required to enable infected timber to be detected before it has suffered any damage. One feature of good timber is that it emits a sonorous sound when struck, but if the timber is in such a bad condition that, when struck, it emits a dull sound, that timber is already unfit for use. The test which consists in boring into the timber with a gimlet or augur is also useless for detecting incipient dry rot. It would be interesting, in the case of a decayed floor, to know how the first spore or seed from which the fungus was developed was brought in contact with a floorboard which was in perfect condition when the floor was constructed.

Much was written during the last century by Bowden, Britton, and others concerning dry rot, and many remedies and preservatives were recommended, but very little advance has been made within the last forty years in our knowledge of the subject. Many architects and builders have no doubt had to deal with interesting cases of dry rot, and we should welcome any correspondence which is likely to throw further light upon the nature of the disease and the methods by which it may be successfully combated.

The fungus which is responsible for the appearance of dry rot in timber emanates from a spore which has been deposited upon the timber, but only when the timber is moist and surrounded by stagnant air can the spore develop into a flourishing fungus. The finest fungi grow upon timber exposed to a warm, damp atmosphere, in a situation free from draughts.

The appearance of the fungus varies with the conditions under which it grows, but it usually assumes the form of a soft web of white, yellow, or brown colour spread over the surface of the timber. Its growth is accompanied by the emission of a musty odour. When the growth is allowed to proceed unchecked the timber is gradually converted into a mass which can easily be crumbled to powder in the hands, and the web-like fungus is seen in the interior of the wood as well as on the surface. On balk timber the fungi sometimes assume the form of red spots. During the process of the decomposition of the wood carbon dioxide, water, and other more complex gases are produced. When a spore has commenced to grow upon the timber the fungus which is developed from it speedily reaches a sufficiently mature state to throw off from itself numerous spores which in turn develop into fungi, if the timber continues in condition suitable for fungi growth.

The fungus cannot live without water, and dry timber exposed in a dry atmosphere cannot, therefore, be attacked by dry rot. The spread of dry rot in timber may be due to some defect in the timber itself, or to the exposure of good timber to conditions favourable to the growth of the dry rot fungus. If the timber has not been properly seasoned, and contains, therefore, a considerable quantity of sap, the speedy appearance of dry rot may be expected. Unseasoned timber stacked in such a way that fresh air cannot play freely around it is very liable to be attacked. Timber which has been varnished or painted before it has been sufficiently seasoned is also prone to attack, because it is kept always in a moist condition, owing to the water of the sap being imprisoned by the waterproof coat of paint or varnish.

The most common cause of the development of dry rot in houses is the construction of a kitchen floor over damp earth, or over a moist concrete foundation, and the covering of the upper surface of the floor with linoleum or other material which prevents access of fresh air to the surface of the timber. Timber so treated is exposed to all the most favourable conditions for the rapid growth of the fungus, viz. :—(1) Presence of moisture; (2) warmth; and (3)

exposure in stagnant air. It is worthy of note that although moisture is essential to the fungus growth, yet timber kept under water appears to be immune from dry rot.

It should be remembered that most of the conditions which favour the growth of the dry rot fungus are inimical to human life, and the appearance of the fungus upon the walls or floor of a dwelling room should, therefore, be accepted as evidence that the atmosphere in the neighbourhood of the fungus is stagnant and damp, and liable to injuriously affect persons exposed to its influence. Fresh air and sunlight, which are so beneficial to animal life, will destroy dry rot fungi in a few hours.

2.—*Prevention and Cure.*

To ensure that the timber used in building construction shall remain free from dry rot only properly seasoned timber should be used, and, so far as is possible, it should be protected from contact with damp stagnant air. Care should also be taken that every piece of timber used in the building is sound, and free from visible sign of infection.

The most effective inexpensive method of protecting timber from the dry rot fungus and other destructive organisms is to subject it to the creosoting process so largely used for preserving railway sleepers. The timber is first placed under a vacuum to remove most of the moisture and air, and is then treated in the same chamber with hot creosote under high pressure. This treatment ensures far better penetration of the creosote into the interior of the timber than can be obtained by merely painting the wood with creosote. The use of creosoted timber is, however, impossible in most buildings, owing to the odour it emits, and to the effect of the creosote upon the appearance of the wood.

For both prevention and cure of dry rot exposure of the timber to fresh air and sunlight is the best treatment, but where this is impossible the timber may be impregnated with a suitable metallic salt or with an antiseptic oil. Some of the salts, however, which have been suggested for destroying the fungus are so poisonous in themselves that in many cases it would not be safe to use them. Treatment of the timber with a solution of mercuric chloride, as recommended by Kyan, is expensive and would be dangerous for use in dwellings. Arsenic salts are also dangerous. A saturated solution of copper sulphate, which is frequently recommended, is cheaper, and not so objectionable as mercuric chloride, but copper sulphate is, nevertheless, a poisonous salt.

Others have proposed the use of mineral acids, such as sulphuric acid and hydrochloric acid, for destroying the fungus, but these are liable to injure the timber. Acid solutions of metallic salts, such as acid chloride of zinc, are also objectionable. Petroleum has also been recommended, but this increases the inflammability of the wood, and causes it to emit a disagreeable odour of petroleum for a very long period.

Many patented compositions, sold under fancy names, have been used with more or less success. The most effective usually owe their efficiency to the presence of one or more distillates from coal-tar. The use of an alcoholic solution of salicylic acid has been recommended. This would have the advantage of leaving the timber odourless, and would probably be as effective as creosote, but would be much more costly.

No useful purpose would be served by giving a complete list of the very large number of mixtures which have been advocated at different times as infallible cures for dry rot. Some of them are absurdly complex, such as the following: A solution containing 3·3 per cent. of manganous chloride, 2 per cent. of orthophosphoric acid, 1·2 per cent. of magnesium chloride, 1 per cent. of boric acid, and 2·5 per cent. of ammonium chloride. Any builder let loose in a drug store could no doubt succeed in compounding an equally formidable mixture for the unfortunate fungus, but such frenzied efforts are quite unnecessary. There is no difficulty in destroying the fungus, but to prevent its renewed growth in the case of the underside of a kitchen floor constructed over damp earth or damp concrete, and where proper ventilation cannot be obtained, is a difficult matter. If the ground beneath the floor consists of earth, and the fungus can be seen growing upon it in patches, some good may be done by removing as much of the earth as is practicable, and putting in its place dry sand free from vegetable mould; but we doubt whether any treatment which does not include exposure of at least one side of the floor boards to currents of fresh air will prove wholly satisfactory.

HOUSING OF THE WORKING CLASSES.

THE Report of the Housing of the Working Classes Committee (No. 1) recently issued contains some particulars worthy of consideration. Up to March 31 last the London County Council provided housing accommodation for 41,602 persons, consisting of 1,845 cubicles, 1,484 cottages, and 5,990 tenements in block dwellings. The net rental of all the dwellings was 140,423*l.* The expenditure on dwellings in occupation was 138,706*l.* This expenditure includes 76,159*l.* for interest and sinking fund charges, 16,410*l.* transferred to repairs and renewals (although the actual expenditure on repairs was only 10,799*l.*), and 46,137*l.* on rates, taxes, supervision, rent collection, etc. Thus on the dwellings in occupation there was a small surplus. The total expenditure on capital account on all dwellings and estates amounted to 2,498,533*l.*, and a sum of about 45,111*l.* seems to have been temporarily taken out of the rates towards sinking fund expenses.

The important feature of the Report is, however, the number of unoccupied dwellings, involving a loss of income of 14,988*l.*, or 9·55 of the gross rental. The Report deals at some length with this question, and attributes the cause chiefly to the dwellings erected by the Council under statutory obligation to rehouse persons displaced by improvement schemes. Many instances are cited of dwellings thus erected when there was apparent demand for accommodation in the localities, but which it has proved difficult to find tenants for, despite a continued reduction in rents. This fact should be borne in mind in future schemes for rehousing displaced populations. Although the Housing of the Working Classes Act, 1890, enacts in sect. 11 that the scheme shall provide for the rehousing of at least as many persons as are displaced, a certain latitude in area is allowed, and this point has hardly perhaps received sufficient attention. Thus we find in this Report that difficulty has been experienced in letting the tenements in Durham-buildings, York-road, Battersea, by reason of the contiguity of two factories. Apart from such special drawbacks, it may be doubted whether, when a section of the population are uprooted, anything like the total number will seek fresh dwellings in the immediate neighbourhood, and this fact has not been considered in the Act.

As regards the loss by vacant dwellings in those houses erected voluntarily by the Council under Part III. of the Act, sufficient time has hardly elapsed since the completion of the buildings referred to in the Report to enable any certain conclusions to be drawn. Whether the Council was wise in competing with private enterprise is another question.

One small point may be noticed in conclusion. In Islington the Borough Council has collected the rates in advance from the tenants quarterly. The Report states that this fact has rendered the letting of tenements more difficult, and it is intended to arrange for the rates being compounded. We should be glad to see the rates levied directly in every case, as, if compounded, they are too apt to be confused with rent. Now that the electors take such an interest in municipal elections it is well that the incidence of rates should be brought directly home to them.

NOTES.

The Gardens of Versailles.

SOME years ago, in an article on "Versailles under the Republic," we commented on the lamentable manner in which this great and unique example of a pleasure garden on a grand scale was being allowed to fall into a neglected condition, and expressed the opinion that more money ought to be expended in keeping it up to its original condition. We are glad to gather, from a paragraph on the foreign page of the *Times*, that the French authorities seem to be coming to the same conclusion. The annual grant of 95,000 francs for the maintenance of the Gardens is recognised to be most inadequate, and a Parliamentary Report estimates the cost of the most urgent work required at a million francs. A society has been formed under the title "Les Amis de Versailles," to keep an eye on the condition of the Gardens and urge their proper maintenance. It is to be hoped they will succeed. Versailles was originally made, it is true, out of little less than the wholesale robbery of the French people for the whim of a monarch; but there it is, and it ought now to be regarded as a great

national possession of which the most should be made.

Cretan Exploration.

DR. ARTHUR J. EVANS appealed, in a letter to the *Times* on Monday last, for subscriptions towards the further prosecution of his researches in Crete, which have already had such remarkable results. Chances of further discoveries have presented themselves, in the discovery of a new quarter unexplored, to the south-west of the palace; and also of the cupola, beneath the southern porch, of a vast "bee-hive chamber" (the expression denotes we presume the sectional shape of the chamber) cut out of the rock, and belonging to a period that lies behind the Age of the Cretan Palaces. A shaft sunk 25 ft. below the vault of this failed to reach the floor of the chamber; but by this time the explorer's available resources had been carried to their utmost limit, and the work had to be broken off for want of funds. At least another 3,000*l.* will be required to complete these explorations. As Dr. Evans observes (and it is to the discredit of this country that he should have to say so), an English explorer cannot rely, like his French, German, and Italian colleagues, on Government grants or subventions from national Academies; he has to rely on his own resources and on subscriptions from private individuals. Those who are able and willing to assist in a work of exploration of such extraordinary interest are asked to send subscriptions to Mr. G. A. Macmillan, St. Martin-street, W.C., or to Messrs. Robarts, Lubbock, & Co., Lombard-street. We hope the appeal will meet with a substantial response.

The Smoke Problem.

IN the paper with which Dr. Louis Parkes opened the discussion last week at the Royal Sanitary Institute some sensible proposals are made for the amendment of the Act of 1891 dealing with the smoke nuisance in London. As Dr. Parkes contends, there is really no reason in law or in sense why private individuals should be allowed to defile the atmosphere in a way that is forbidden to traders and other owners or users of boiler chimneys. Again, the attempt to establish a distinction between permissible and non-permissible smoke by the aid of the word "black" clearly leaves a loop-hole, and a very big one, for air-pollution on a large scale. There is no difference except in degree between "black" and "brown" smoke, and there can be no dividing-line between the two. Even if diluted so as to become brown smoke is still a nuisance, and the act of dilution does not reduce the total amount of solid carbon discharged. In spite of the best modern appliances boiler chimneys still emit smoke that might be obviated by the use of better coal, which would be more generally employed if the Act of 1891 were suitably amended. The establishment of restrictions against smoke from domestic chimneys would probably lead to the adoption of improved fire-places and stoves, and the extended application of gas and electricity for heating purposes. Changes of the kind might not be popular, but there can be no two opinions as to the good effect they would have in further improving the atmospheric conditions of London.

The Port of London.

IN the Report presented by the Rivers Committee to the main body of the London County Council, some instructive particulars are given relative to the conditions prevailing at various British and Continental ports visited by the Committee during the past summer. In addition to the large extensions made within recent years to the dock and river quay accommodation at Antwerp, a great scheme of dock development is in progress at an estimated cost of about 12,000,000*l.* At Rotterdam a large new dock has recently been completed, and further work of the same kind is in hand. Great improvements have been effected at Hamburg, Bremen, and Bremerhaven; and at the last-mentioned place new docks to the value of two and a half millions are to be built. Against all these developments the only important structural work completed within the last ten years is the new dock of the Surrey Commercial Dock Company, built at the cost of some 1,400,000*l.* All other projects are tied up, and all enterprise is stifled by the unsettled condition of the Port problem. Notwithstanding the increased trade of London, business is already being diverted to other ports owing to lack of adequate modern accommodation. The position may not be alarming at the present time, but it must be remembered that reforms and extensions cannot be executed in a day. Therefore we are quite in accord with the conclusion of the Rivers Committee that there should be no delay in constituting an authority for the Port of London competent to decide exactly what are its deficiencies, and how they may best be made good. Whether the Government will once more be debarred from carrying out the undertaking given last year by Mr. Lloyd-George remains to be seen.

Trade Union Conditions in Contracts.

IN our last week's issue we commented with approval on the decision of the Works Committee of the Kensington Borough Council not to take steps to see that trade union wages and hours of labour are complied with by contractors executing contracts for the Council. We therefore regret to see that on the matter being referred back a contrary decision was arrived at. The Works Committee now recommend that the Borough Engineer or other responsible official be instructed, in the event of there being any suspicion that a contractor is not paying the wages and observing the hours of labour recognised by associations of employers and trade unions and in practice obtained in the district in which the work is executed, to take steps to investigate the matter with a view to the enforcement of the conditions in the contract. We have already endorsed the views expressed by the Borough Engineer on this question, and other incidents have come under our notice which tend to show how undesirable any interference between employer and employed in the interests of trade unions is in practice.

Earthquakes and Fire Insurance.

THE Jamaica earthquake is giving rise to some interesting questions in relation to fire insurance. Some of the policies contained a condition that they should not cover "loss or damage by fire occasioned by or happening through volcanoes, earthquakes, or hurricanes." A preliminary point came before the Courts last week as to whether such particulars as whether the fire originated in the premises insured or in some other building, how and when it was communicated to the premises, the cause of the original outbreak, and the facts relied upon as showing it was a peril insured against, must be given as "particulars," in addition to the statement of claim, but the Court of Appeal held that such particulars could not be demanded in that form and at that stage of the trial.

Making up Added Portions to Roads.

THE Court of Appeal in the case of Mayor, etc., of Portsmouth *v.* Hall had to decide a question under the Public Health Act, 1875, relating to streets. There was a certain highway repairable by the inhabitants at large of a width of 28 ft. to 30 ft. In 1883, some dispute having arisen as to the extent of the public right with the owners of the land, an agreement was come to between them and the local authority that as soon as any portion of the estate abutting on the road should be laid out for building, the owners should straighten the road and widen it to 40 ft., as the houses were erected. The by-laws then in force only provided for a width of 36 ft. The road was completely laid out by 1904, but had never been declared a highway in its altered form under sect. 152. The local authority had subsequently made up the road under sect. 150, and were seeking to recover the apportioned expenses from the owner of land and premises abutting on the road. The Court held that the effect of the above agreement was the same as if the added portions of the road had been purchased to widen the road under sect. 154. The agreement was a compromise for the benefit of both parties to the original dispute, the local authority having obtained a road wider than that their by-laws provided for, and the then landowner having been allowed to add to the road section by section instead of all at one time. The road was, therefore, in its entirety held to be repairable by the inhabitants at large, and not within sect. 150.

Insulating Materials and Electric Cables.

ON Thursday last week Mr. Alexander Russell read a paper to the Institution of Electrical Engineers which is of practical value to those who have to design electric cables capable of withstanding high pressures demanded by modern conditions. The author discusses in detail the laws of disruptive discharge, methods of determining the dielectric strength of gases, liquids, and solids, and the electric stresses on the insulating materials of cables with special reference to the scientific grading of cables. Although part of an insulating material may break down under electric stress, Mr. Russell shows that it is not right to conclude that a disruptive discharge immediately ensues. The breaking down of a portion of the dielectric may, in fact, relieve the electric stress on the remainder, and no disruptive discharge takes place until the stress on that part

also exceeds the dielectric resistance. Having dealt with methods of measuring the dielectric strength of gases, liquids, and isotropic and æolotropic solids, by finding the disruptive or sparking voltages between spherical electrodes, the author passes on to consider the electric stresses in concentric cables with isotropic insulating material. The result of his demonstration is that in such cables designed for the maximum permissible working stress V/d, the inner radius of the outer conductor should be the product of the outer radius of the inner conductor into $\epsilon^{d/a}$, where ϵ = the base of Naperian logarithms. Among other conclusions to be drawn from the facts stated are that variations of temperature due to heat generated often make the electric stress more uniform between the two conductors; that the effects of alternating and direct pressures in producing stresses in the insulating material are sometimes quite different; that high-tension cables should be graded so as to make the maximum stress on the dielectric as small as possible; and that stranded conductors should be encased in thin lead tubes so as to prevent the increase of stress on the inner wrapping which is caused by stranding.

Proposed New High-level Bridge at Newcastle.

THE only bridges across the Tyne that are of any real use for ordinary highway traffic between Newcastle and Gateshead are the historic double-decked bridge of Stephenson and the Redheugh Bridge, rebuilt a few years back by Mr. Mitchell Moncrieff. Of course there is also the low-level swing-bridge, but that is not of much account because the normal surface level on either side can only be attained by climbing a steep hill some 80 ft. high. Ever since 1897 the Newcastle City Council have been trying to persuade the Gateshead Corporation to join with them in building a new highway bridge connecting Pilgrim-street on the north side of the river with High-street on the south. In 1905 the Gateshead authorities came to the conclusion that further discussion of the proposal should be adjourned *sine die*, and the matter seemed to have definitely lapsed. It has again been revived by the Newcastle Council, who are now considering the advisability of independent action. There can be no doubt as to the urgent need existing for the bridge. Traffic between the two towns is very much obstructed at present, and the excellent tramway services on each side of the river are necessarily disconnected. By the construction of an adequate bridge providing for tramway services and ordinary vehicular traffic both towns would be equally benefited, and it is to be hoped that the project will not be allowed to remain in abeyance any longer. We cannot understand the hesitation displayed by the Gateshead Council, except on the supposition that they think the effect of long-continued delay will be to induce the Newcastle authorities to build the bridge at their own cost.

Ecclesiastical Dilapidations.

WE had occasion in last week's issue to comment upon a case decided under the Ecclesiastical Dilapidations Act, 1871, and since then another case under the same statute has come before the courts, *ex parte* the Rev. J. E. Loughman. The case would appear one of some hardship. The living was a rectorial manor of the value of some 300*l.* per annum net, and comprised a large Rectory-house and about five acres of land. There were other cottages and lands let at nominal rents on lives, but with fines of a substantial nature. Many of these leases had fallen in, but, owing to the poverty of the tenants, no claims could be sustained against them. In 1896 a survey was made at the Rector's request, the dilapidations being assessed at 300*l.*, a large increase on the previous survey of 1887, owing to the leases which had fallen in and from damage to outbuildings from subsidence. Considerable repairs were executed on the Rectory-house, but no certificate was obtained under sect. 46. The Rector subsequently endeavoured to effect an exchange, but the Bishop's consent could not be obtained. In 1906 a survey at the direction of the Bishop was made, and the dilapidations were assessed—65*l.* on the Rectory-house, 120*l.* on outbuildings, 200*l.* on cottages the leases of which had fallen in. The Rector endeavoured to arrange for the repairs with the patron; failing this he applied for leave to borrow from Queen Anne's Bounty, but the patron declined, and the Bishop ordered a writ of sequestration to issue. The Rector moved for a prohibition on the grounds (1) that a hearing had never been granted to him; (2) that there had been no neglect or refusal on his part to execute the repairs within the meaning of sect. 23 of the Ecclesiastical Dilapidations Act, 1871. The Court of the King's Bench Division held that since no objection had been taken in writing by the incumbent to the report of survey under sect. 16, the report became final, and that since the incumbent had failed to carry out the work, he had "neglected and refused" to do so within the meaning of sect. 23, and, therefore, the proceedings ordering sequestration were in order, and the writ of prohibition to the Bishop must be refused.

Hickford's Concert-room, Soho.

ONE of the few, if not the last, remaining of the old concert-rooms of London, forms part of No. 41, Brewer-street, Golden-square. The room stands at the back of the house, and will, it is expected, be pulled down shortly. It retains pretty well its original appearance, but the way opening from Windmill-street has been blocked in. Hickford built the concert-room in 1738, and performances were given there by many of the most eminent musicians and composers of the day. When Leopold Mozart came to London in April, 1764, he took lodgings for himself and his two children in Cecil-court, St. Martin's-lane; the young Mozart and his sister gave a concert in Hickford's room in May of the next year. Some years ago the room was Willis's Dancing Academy; it has recently been occupied by a club.

The Leicester Galleries.

AT the Leicester Galleries there is an exhibition of water-colour drawings by a French artist, M. Dulac; a series of illustrations to the Arabian Nights. In M. Dulac's conception of the characters, and in a certain vein of grotesque humour in many of the drawings, there is a good deal of resemblance to the work of Mr. Rackham, though the method of execution is quite different; M. Dulac is a water-colourist, with a true sense of colour. Some of the female characters from the Arabian Nights have a great deal of beauty of face and costume, *e.g.*, "Pirouzè" (4), "Scheherazadè" (12), and "The Queen of the Ebony Isles" (26) with her black panther; but they seem all too tall and deficient in figure. His conceptions of some of the genii, and the old men with long beards and prodigious turbans (see No. 16) are admirable as pieces of grotesque. The bat-winged figure in the sky (56)—"by her wicked machinations the city became a lake"—is powerfully designed; and in some of the drawings (see 25) there are good landscape effects. As a whole the collection shows a good deal of original genius. In the inner room is a representative collection of water-colour drawings by Mr. Thorne Waite. As seen here, Mr. Waite seems to have two styles; the delicate and rather pretty style with faint distances, as in "The Valley of the Cuckmere" (30), and the broader and more powerful style shown in a good many of the smaller works (28, 43, and others), and in the very fine large work "Alfriston Valley" (15), a grand drawing both in style and composition, and quite the best work in the collection, which as a whole is, we need hardly say, of a high order. The works exhibited were not painted for this exhibition; they extend over a good many years; one reason, perhaps, for the difference of style noticeable in them.

The Fine Art Society.

AT the Gallery of the Fine Art Society is a collection of water-colours, chiefly landscapes, interspersed with a few shipping subjects, by Mr. and Mrs. Young Hunter. Their style is very much alike, so much so that it is difficult to classify the two artists apart, except that the yacht and ship subjects seem all to be by Mr. Hunter. They give the impression of being water-colours by artists who have formed their style in oil-painting, and treat water-colour in rather the same way—broad masses of colour without the delicacy and transparency which are the distinguishing qualities of water-colour; and sometimes the effect is rather crude and heavy. But there are fine landscape effects and compositions among the drawings; notably in Mrs. Hunter's "Bothwell Castle" (31), and "Craignethan Farm" (37), and Mr. Hunter's "Brink of Corra Lynn" (19), where the effect of water running down hill is so well conveyed. Mr. Hunter's "Dunderave Castle" (61) and "The River at Lamington" (72) with a fine sky above it, are two of his best. All the shipping subjects are well treated, which is the more noticeable as we do not remember to have seen a subject of this class from Mr. Hunter before; his reputation has been mostly made in the class of pictures which may be styled "interiors with figures."

The Builders' Benevolent Institution.

THE Annual Dinner of the Builders' Benevolent Institution will be held next week, on the 28th; Mr. F. Higgs, of the firm of

Messrs. F. & H. F. Higgs, being in the chair. We may take the opportunity of calling the attention of our readers to the claims of this Institution, which was founded in 1847, with the special object of granting Pensions (42*l.* per annum to men, and 30*l.* to women) to necessitous members of the London Building Trade and its various branches, who have been masters; and to their widows. The income of the Institution is derived from voluntary contributions from master builders and members of allied professions and trades, and from interest on investments. The policy of the Committee of Management, who are elected at annual meetings for three years, has been, as far as possible, to elect pensioners without putting them to the trouble and expense incident to contested elections. This is an Institution which may rightly appeal to the architectural profession for support as well as to the building trade, since architects undoubtedly owe a great deal to builders in the efficient carrying out of their designs.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE fortnightly meeting of the Royal Institute of British Architects was held on Monday at the rooms of the Institute, 9, Conduit-street, Mr. Leonard Stokes (Vice-President) in the chair.

Deceased Members.

Mr. Alexander Graham (Hon. Secretary) announced the decease of Mr. George R. Crickmay, Fellow, elected 1884. He also had to state that they had lost one of their hon. corresponding members in France—a very distinguished man, M. Trélat. The deceased had a very great career, and his influence had been considerable in the promotion of architecture. They were proud to say that he had been a member of the Institute since 1884, and had been very useful in his correspondence on various matters connected with their art. With their permission a letter of condolence would be forwarded to the family of the deceased.

St. Paul's Cathedral.

A paper on "The Present Condition of St. Paul's Cathedral" was then read by Mr. Mervyn Macartney, Surveyor to the Fabric of St. Paul's, of which the following is an abstract: Mr. Macartney, in opening his subject, said that the occasions on which he might becomingly break the silence which, as Surveyor to the Fabric of St. Paul's, he had to maintain were few; a gathering of architects, meeting under the auspices of the Institute, was, indeed, the only exception he could make. Dealing at some length with the Report recently published of the Committee of Architects appointed by the Dean and Chapter, Mr. Macartney referred to the circumstances under which the Committee came to be appointed, and read passages from the Committee's interim report, pointing out the danger which would threaten the Cathedral if the London County Council sewer were constructed in such near proximity to it, and urging the adoption of another route in order to guard the building from all possible risk. The author then gave a brief survey of the conditions under which the Cathedral was built, and referred to various repairs carried out during the eighteenth century. From the date of the completion of the shell of the building there was no evidence of any anxiety for the building's safety for over a century. The first note of alarm was sounded in 1831, when a sewer was schemed to go round the south side of the church from Ludgate-hill to Cannon-street. Mr. Cockerell, the Cathedral Surveyor, drew the attention of the authorities to the danger, and, together with Messrs. Robert Smirke and George Rennie, drafted a report giving their opinion that the fabric would be endangered if the sewer were constructed in the Churchyard, and recommending a new line for the sewage. The author quoted some interesting letters on the subject which passed at that time between Messrs. Cockerell, Rennie, and Smirke. The result was that the Commissioners of Sewers consented to divert the sewer along Carter-lane. The next note of alarm was heard in 1890, when the Central London Railway Bill was before Parliament. The proposal was to run a tunnel the length of Newgate-street at a depth of more than 70 ft. below the floor of the church. Mr. Penrose, in November, 1890, reported that a tunnel so placed would drain off the water from the lower strata of the gravel and sand which underlie the foundations of the Cathedral, and so cause them, to some extent, to collapse there, and risk serious injury to the structure. This scheme passed a Committee of the House of Commons, but was thrown out by a Committee of the Lords, on the petition of the Dean and Chapter.

Coming to the present condition of the Cathedral, the main points of weakness in the Cathedral—the parts, that is to say, which have shown, and on the slightest disturbance will show again, signs of settlement and movement—are the dome, the south transept, and the western towers and portico.

The settlement of the dome, which had largely occurred during the progress of the building, shows that, in spite of the care with which Wren spread the weight, the centre of the great mass has sunk and is now severed from the surrounding masses. The dome is carried on eight great piers about 30 ft. long—those at the crypt are connected with the bastion-like masses at the angles of transepts with nave and choir by long barrel vaults—these are in every case cracked through. The weight of the superstructure rests much more on the inner ends of these eight piers than on the outer ends, and the sinking of these piers has set up movements overhead. Moreover, these great piers have not sunk equally, those on the south side connecting with the south transept being lower than the others; and of these the westernmost has descended bodily over 6 in. These may be seen in a striking degree in the colonnade round the drum of the dome. These columns are in reality the outer ends of a series of arches set at right angles to the thrust of the base of the cone. The arches and the roundels above them are all more or less cracked, and the colonnade is practically severed from that part of the arch which abuts on the dome. The dislocation is sometimes very great. This downward tendency of the central mass of the dome may be illustrated further from the clearstory windows which adjoin it and from the triforium arches in the transepts. Between the south or end wall of the south transept and the pier which carries the dome at that point the great arch into the aisle and the clearstory wall above are broken through. In a less degree, according to the subsidence of the mass of the dome, this occurs in connection with each dome pier.

The south transept has suffered in addition to the dislocation of the parts abutting on the dome by the tendency of the south front of it to move outwards.

The walls of the southern façade have moved outwards, and have sunk slightly to the east and west; this showed itself in the south window arch and in the upper part of the transept.

Coming to the west front two tendencies are found at work, the one arising from the other; the two towers are out of the perpendicular, the one to the north and the other to the south; and the portico, which has been said to be the only flimsy piece of construction in the Cathedral, has followed the direction of the towers, and, in addition, has moved westwards.

In August, 1901, the south-west tower was plumbed to a height of some 113 ft., and a deviation was noted which when worked out proves that the top hangs over some inches south-west, while the other tower inclines, though to a less degree, to the north-west.

The movement of the south tower has affected that part of the building east of it, and in the library, over the south-west chapel, the indications of the movement are very clearly seen. A further proof of the movement of the towers is the curved line of the granite steps which was found necessary in order to avoid partly burying the bases of the columns of the portico.

These inclinations are sufficient in themselves to jeopardise the safety of the two wide arches of the portico between the towers. The towers actually form the abutment of these arched ceilings, which have a span of 48 ft., while they do not rise to 10 ft.

The portico consists of two stories, and the front is composed of two series of coupled columns, and is not in itself a very stable piece of construction; instead of the spaces between them being bridged by single pieces of stone, concealed arches are made use of; at the north and south ends these arches are without any solid abutment, and yet on them rests the heavy mass of the pediment. Then the two ranges of columns each support a cornice which projects westwards with no similar projection to the east to counterbalance it. Above the upper cornice the cornice of the pediment and the sculpture of the tympanum also overhang. Thus there is a height of about 112 ft., and the shaft of the columns supporting it 4 ft. at their thickest, with considerable voids between them.

After very considerable repair and much renewal the portico has been restored to its original state—allowing, of course, for the increase in its span—and, assuming that existing conditions can be maintained, may be said to be safe. But the secret of its weakness has been learned while providing for its strength, and it is seen how dependent it is on the western towers, and how they in turn stand or fall by the maintenance unimpaired of the ground on which they were built.

The average depth of the foundations is 4 ft 6 in. below the crypt floor, which is 6 ft. below the ground level north and south, and the footings of the walls consist of three 12-in. courses of stone with a projection of about 2 ft. In no case have these shown signs of insufficiency, nor has any organic weakness been discovered in the structure itself. Where the walls have been opened for one reason or another they have been found to be perfectly well constructed. In conclusion Mr. Macartney showed diagrams of the borings recently made, and said that all observations tend to prove that the danger to the Cathedral comes from subterranean or atmospheric influences. Interference with the subsoil was clearly not contemplated by Wren, and without it we might even now reduce to a minimum the Cathedral's danger.

The Dome of St. Paul's.

Mr. William Dunn then described the Dome of St. Paul's. He said: So much has been said and written on St. Paul's dome from the general point of view that I feel I could not hope to interest you by merely adding my own views of the construction adopted by Wren.

I might have attempted what I believe has not yet been done—a mathematical investigation showing the nature, amount, and distribution of the stresses with such accuracy as could be attained in so indeterminate a structure. That would be, I think, an interesting subject, and one of considerable value to the guardians of the Cathedral and to the public, but it is more suitable for a written communication which we can read and debate at leisure than for utterance on such an occasion as this. I therefore thought it better to make a short study of some details of construction which could be explained orally and by drawings of sufficient importance and interest to justify me in bringing them before you, and which had either not been previously mentioned or else been very little discussed. Mr. Macartney very kindly supplied me with various drawings, and with the help of his assistant, Mr. Halley, I made various sketches and measurements in parts undisturbed for years back, if we may judge from the dust. From the measurements taken plans and sections were prepared, but I thought that the relations of the whole would be better displayed in an isometrical view such as foreign students have made of St. Peter's, of the Duomo at Florence, and other domes, but which no one has undertaken, so far as I know, for St. Paul's, with the result which I have the pleasure to put before you.

It is a peculiarity in domes that, while any load affects all parts of the structure below it, it has no effect on the stresses in the parts above it. Accordingly, we may

properly begin our description at the top, where we would begin an investigation of its strength.

The lantern is a massive stone structure, the exterior rectangular in plan, about 20 ft. over all, and about 50 ft. high. The interior is an octagon shape, and the whole is surmounted by a small wooden dome on which is the ball and cross of sheet metal on very heavy wrought-iron frames.

At the top of the great outer dome and at the base of the lantern is a belt or girdle of stone forming the apparent abutment for the top of the ribs of the outer dome, and appearing as a base for the lantern.

This girdle of stone is about 10 in. in thickness and 11 ft. in height. It is tied back by metal ties to the main body of the lantern; these are visible just below the stone floor of the golden gallery and radiate from the centre. They are about 2 in. by 2 in. in section.

All this heavy load of an irregular shape had to be supported by the apex of a hollow cone. A hollow cone is fairly stable if supporting vertical loads round its periphery such as arise from the weight of a circular drum. It is not at all a stable form under loads such as Wren had to deal with, unless these loads are converted into vertical loads uniformly distributed round its circumference, and that is what he has done.

The method adopted was to place on the cone a domed top such as we put over a well, and to use this as a foundation for the lantern. Over this domed top he distributed the weight of the lantern by buttresses, the lower parts being radial and sloping, the upper parts being vertical and at right angles to the square of the lantern and to each other. The view shows these buttresses or foundations, on which rests not only the main body of the lantern, but the stone platform of the golden gallery. The outer edge of the platform rests on the circular girdle or drum of the stone before referred to; the bases of the buttresses and this drum must rest on stones which are part of the arch rings of the dome top of the cone, and which stones have the top beds horizontal, as in sketch, but the dust of ages and the difficulty of access prevented me from actually seeing this.

Like well tops, this domed top had also an eye or opening in the centre, so that in section the lantern seems carried on an arch without a keystone. Of course, the reason why this stands is that, unlike arch stones, the stones of which it is built are subjected to pressure on all four faces, so that they cannot collapse inwards. But if the top of the cone or base of the domed top spread outwards we should see a series of radial cracks extending from the base towards the centre, and this would lead if sufficiently extended to collapse. This spreading of the base is usually resisted in wells by the resistance of the earth Wren supplied it by three iron ties shown on the original sections, one of which is visible crossing the openings at the apex of the cone, and measured 4 in. by 1¼ in.; the other two are buried in the thickness of the stone.

The positions of these three circumferential ties are well chosen. They are close together, and as the absence of radial cracks in the dome top has shown that they are sufficient for the work their effect is to convert the loading immediately below each point at which they occur into purely vertical loading. In an arch the thrust is constant from key to spring; in a dome the thrust is constantly increasing downwards until the inclination of the surface of the dome to the horizon exceeds a certain angle. Below that angle one of two things happen—either the material of which the dome is formed gradually takes up bit by bit this thrust until, the dome being hemispherical, the whole thrust has been gradually overcome; or else it splits into a series of arches and the thrust remains constant at the value it has at the crown-ring of the arches. But if we mistrust the material, if we are using concrete, or stone, or brick—materials which have but small resistance to tention, and which may have even that small resistance destroyed, as in the case of concrete by shrinkage stresses, or in the case of stone or brick by unequal settlement—we may, as Wren has done, put in a series of bands of a material which will resist tension, and so have either reinforced concrete or reinforced masonry. The effect of each tie, providing it does not yield, is to convert the load on the point below it into a vertical load.

You will observe from the large section shown you that Wren has put a series of seven circumferential ties round the cone above at various points from top to bottom, with the object of making each upper section independent of the spreading of the part below from settlement or yielding of the ties. A great deal has been written about the danger of iron embedded in stone. It is a danger undoubtedly if the air is not excluded from the iron. But given unpainted iron and an impervious covering of mortar or concrete, iron does not rust, but remains bright, nay, even loses such rust as it had, and becomes bright.

You may remember that Mr. Somers Clarke had the great chain round the dome exposed, and found it quite bright and clean; that was because the air had been excluded. It is a more difficult matter to exclude it from air in an 18-in. stone or brick wall, and the theory of its protection was not understood in Wren's time.

In a case in the gallery over the south aisle there are many pieces of wrought-iron cramps and such-like things taken from the old walls which show in a curious way the laminations of the iron splitting apart under rust. There are in the same case pieces of copper which have stood well, and no doubt that metal would have been used but for the expense. Nevertheless, and recognising the dangers of iron, and it is said taking precautions against it by running the ties in lead, he did wisely in thus binding his cupola and dome, and, as time has shown, rendering it in some measure independent of the settlements of the great supporting piers which have since taken place.

We hear a great deal of rather unconsidered talk about domes without iron ties. Domes of any size require very large abutments to be stable without such ties, and though we may put sufficient abutment when the cupola rises from the ground, as in the Pantheon, we can rarely do so when it is raised on a drum, as in the Duomo at Florence, or in St. Peter's, at Rome.

I hope when time permits to complete the drawing showing the interesting construction of the cone at its base where it unites with the inner brick dome. I do not find anywhere any sketches or drawings showing this clearly, and I have sufficient measurements to do so. I also hope to make a mathematical investigation, but that should be presented to you in a written communication.

Mr. Slater, in proposing a hearty vote of thanks to the readers of the papers, said that the question of the stability of St. Paul's Cathedral was one which appealed, not only to all Londoners, but to all Englishmen, because St. Paul's was a national building, and was so often compared with St. Peter's on the matter of the rapidity of its construction and other points. The paper which Mr. Macartney had read to them had been very exhaustive with regard to the early settlements in the structure, and from what he had said he thought it must be fairly clear that the main settlements had been on the side which they would have expected, viz., where the slope towards Fleet-street occurred. He would have been very glad, and he thought that they all would have liked, to have heard Mr. Macartney tell them a little more as to the result which his investigations had shown as having occurred from the construction of the tube railway. They had heard that Mr. Penrose was very fearful as to the result of this railway being constructed, but he did not gather from Mr. Macartney whether any of the effects which Mr. Penrose feared had really occurred. This was a subject of very great interest indeed to all architects. He himself had been consulted some two or three years ago as to the safety of Bow Church and various other buildings on the line of the Central London Railway, and he had a theory which might or might not be correct. It appeared to him that the construction of a tube railway was of such a nature that it was almost impossible to avoid a slight displacement of the strata through which the tube was driven between the time that the first driving of the shield occurred and the entire filling up of the space both above and below the tube with very strong liquid cement or fine concrete, which was driven in at considerable pressure. During this time he thought it extremely probable that certain settlements would occur, and there was no doubt whatever that they had occurred. The tower of Bow Church, as most people knew, had tilted over to the extent, he believed, of some 6 in., and just after the construction of the tube railway the opinion was expressed that this overhanging might go on and increase, and that the safety of the fabric would be very seriously endangered. He took an opposite view to that, because, in his opinion, after the construction of the tube and the entire filling up of the space round it, he thought the effect of the hollow tube through which the train passed was really no more than if they had driven an absolutely solid wedge through the strata, and unless the tube itself collapsed there would be no further displacement of the strata, and no further danger to the structures which had been affected. The construction of a sewer, however, was not the same thing as the construction of a tube railway, and, as far as he was able to form an opinion, he felt that the committee of experts were perfectly right in urging that this sewer which the London County Council were proposing to construct should not be constructed in the position intended. That opinion had been borne out by all that Mr. Macartney had said that night. With regard to the short paper which Mr. Dunn had read, he was quite sure that everyone must have been perfectly charmed with the unique isometrical view of the dome and cupola which had been shown, because it was really an enlightenment to all of them. He for one, and he did not think many others there had never seen such a striking view of the construction of the dome of St. Paul's.

Mr. Phenè Spiers, in seconding the vote of thanks, expressed regret that the duty had not been entrusted to someone who had more knowledge of the subject of the settlements which had occurred. There were several present who had a knowledge of the matter, and Mr. Douglass Mathews would have been able to have given information of great value to them all. It seemed to him that the most serious settlements were under the dome, which occurred during the progress of the building, as an attempt was apparently made then to make the piers good, but to what extent these cracks might be further increased by the shifting of the soil underneath was a point which engineers would be able to determine. There was one point which struck him as to the dome. He was thinking of the question of the great dome of the Pantheon, and remembered that it was stated in a paper read some time ago, which was illustrated by drawings, that there was actually no thrust whatever, in the lower portion at all events, because the whole of the construction was in horizontal courses. As regarded the upper portion, there were certain resemblances in the construction of St. Paul's.

Mr. F. Fox, M.Inst.C.E., said it had been his good fortune to visit the Cathedral both in the company of the late Mr. Penrose and also of Mr. Somers Clark, and had taken very great interest in the building. With regard to the arching of the steps at the western portal, Mr. Penrose distinctly told him it was due to its having been copied from the steps of the Pantheon. Whether it was or not, he could only say that that was what Mr. Penrose told him. As regarded the injury to the Cathedral, there was no doubt it was greatly due to the construction of the sewer in 1835, and the massive tie-rods which they had seen were put in at that date. As regarded Bow Church, he would not say anything now, as the Institute had invited him to address them in February next, when he hoped to touch on that subject, but he would like to say a word with reference to tube railways. He thought the diverting of the sewer was the right thing to do, but if there had not been another route for it personally he would not have hesitated to drive that sewer without the slightest injury to St. Paul's Cathedral or any other building in London. It all depended on how it was done. He had to superintend with his brother, Sir Douglas Fox, on behalf of the Gresham Committee, the construction of the tube railway then being built by the late Sir Benjamin Baker and Mr. Mott under Threadneedle-street, and the Committee were alarmed lest there should be any damage done to the Royal Exchange and other buildings. He had an interview with

Sir Benjamin Baker, and told him he did not at all like the idea of these tunnels being driven under Threadneedle-street so near to the Bank of England and the Royal Exchange for fear of settlement, and Sir Benjamin turned round and said: "I know what you want; you want compressed air." He replied that that was what he did want, and he was promised that he should have it. Well, they did have it, and there was not the slightest movement. If there had been the frescoes on the walls of the Royal Exchange would have been the first tell-tale showing there was settlement. He held that they could drive a tube railway through the clay of London without anyone knowing they were below them, and he wished to dissipate anything like that sort of fear which was in the minds of many architects that there was danger in the construction of tube railways. He said there was no danger if they got into London clay and did it under proper conditions. With respect to the section of the strata shown on the sheet, he could not help regarding it as absolutely incorrect, because if they worked out the measurements it gave to St. Paul's Cathedral the height of 56 ft. Further, the section did not show the position of the Central London Railway. The tube railway had done no harm to St. Paul's, nor could it do harm. With regard to the tie-rods, he hoped, as he had said, to speak to them later on, and he thought that after he had shown them photographs of Winchester Cathedral they would know what cracks really meant. The cracks at Winchester Cathedral were not the things they had seen on the sheets, but there they had settlements of 2 ft 3 in., followed by the distortion of the arch above of a further 1 ft. 9 in. and the overhanging of one of the gables of nearly 4 ft. They had got cracks at Winchester into which, without any exaggeration, one could put one's head. The condition of things at Winchester was most lamentable, and he believed that public attention had only to be drawn to that splendid building for the British public to rally round the Dean and Chapter and enable the Cathedral to be dealt with, for otherwise it was doomed. The stone was disintegrated, the building was out of the upright; but if the British public would rally round them they could hold that building together for another thousand years without any anxiety.

Mr. W. Woodward quite agreed with Mr. Fox that if a tube was properly constructed damage was not likely to arise, but he had been engaged in three or four cases in reference to the construction of tubes and consequent subsidences, and the engineers proved conclusively that Mr. Slater was perfectly right when he said that it was not the tube, but the space of about 2 in. round the tube, which caused the difficulty. If Mr. Fox could succeed in driving a tube without that 2 in., then he believed there would be no subsidences.

Mr. Fox said that if the space round the tube was not properly filled they were, of course, liable to subsidences, but if they were working under compressed air they had ample time to fill this in, and there was no disturbance.

Mr. Douglass Mathews said that about thirty-five years ago he remembered visiting St. Paul's with the Architectural Association, when they very carefully looked over the Cathedral, and at that time certain cracks were shown to them in the south transept. He had been very anxious to hear whether this had gone on to any extent during the time since. He was born almost under the shadow of the Cathedral, and had been there nearly all his life, and knew the building well. Anyone could notice that the south transept had gone to some extent, but from what he had seen that night there did not appear to be any great fear of anything serious happening, because the settlements which had taken place seemed to have occurred soon after the Cathedral was built. As regarded the foundations on which the Cathedral was built, it had fallen to his lot to erect a number of large buildings south to the Cathedral. In one building they were excavating about 20 ft., and they were told that they would endanger the foundations of the Cathedral. It led to a consultation, but all he could say was that both in the case of this building and in Queen Victoria-street and in two or three other buildings they got down into a splendid bed of sand which was very firm, and if there was any subsidence caused by looseness in the sand they would have come across it. In Thames-street, they got a very different foundation. About three years ago there were some borings taken between Thames-street and the river, and it was found that the top soil, the pot earth, varied from about 7 ft. to about 20 ft. Below that there was a kind of mud, and below that, again, there was a considerable quantity of sand and ballast, from about high water to a depth of 23 ft. to 40 ft., until they came upon solid clay. At the time of the discussion in the Press something was said about the river having some effect upon the soil, and that in high tides it loosened a great deal of sand. All he could say was that he had not come across that, and did not think that any rise in the river would affect St. Paul's.

Mr. J. J. Burnet said he was greatly interested in some of the photographs showed by Mr. Macartney, and he would like to know if there was any record of any structural alterations being carried out after the building had been finished by Wren. One or two sections struck him as very weak, and not likely to be the work of an architect of Sir Christopher Wren's calibre. He was particularly interested in Mr. Dunn's paper, and in the drawing, and he would look forward to his promised further communication. He would like to know if Mr. Macartney had discovered the general system under which the iron bands were hooped round the piers. There was evidence of each pier having been bound to prevent splitting, but were the eight piers unified to resist the pressure of the dome?

The Chairman said he would like to remark that Mr. Belcher had sent a letter stating that he did not wish his absence to be taken as meaning that he had no interest in the paper, for it was only the doctor's orders which prevented him being present. They all knew that Mr. Belcher did not enjoy robust health, and they could readily understand why he had not come out that night. They had had two most interesting papers, and they, as Englishmen, might rest content that the Cathedral of St. Paul's in the hands of Mr. Macartney was perfectly safe. An enthusiast like him was not likely to let things go from bad to worse without letting them know. He was bound to confess that the cracks he had seen on the screen were very much less than he expected to see. He rather anticipated seeing cracks into which, as Mr. Fox had suggested, one might put one's head, but he had seen nothing that he could put his fingers into. He did not want to give himself away, but he had occasionally seen these sort of cracks in other buildings, and a little pointing had made the building quite secure. He was very much interested in the remark which Mr. Dunn made about the rings in the dome. He was brought up on the theory—which might be wrong—that there was no thrust in a dome, and that if there was a series of rings each self-contained they could go on piling up those rings as long as they liked, and they would get no thrust. The Hindoo and other Oriental nations, they were told, built their domes without centres. They had a stick in the middle, and that was the centre, and they radiated this way, and they put their bricks all round and eventually got a dome, and he had always understood there was no thrust. He ventured to hope that Mr. Dunn, when he gave them his further notes as to the construction of St. Paul's might possibly think it worth while to reconsider that question as to whether there was any thrust in the dome. He understood that there were seven ties round the conical dome, and he was inclined to think there could be no thrust in a conical dome. Be that as it may, there was no doubt those ties helped to keep the thing together. The proof of the pudding was in the eating, and there the dome stood, and it was just possible it might not have stood without, although he ventured to think it would have stood equally well without the ties. He had no further injudicious remarks to make.

The motion was carried.

Mr. Macartney, in reply, said that Mr. Slater had referred to the question of the tube railway and subsidence. He did not think they had discovered that anything was due to the tube railway at present. Of course, the main point of Mr. Penrose's report was that he objected to the station being placed where it was going to be placed in Cheapside, near the north-east angle of St. Paul's Cathedral. The stations, he believed, were far more dangerous to surrounding buildings than the tube, for they formed, in some cases, drains more or less. Mr. Penrose opposed the station being placed there, and it was moved to Newgate-street. He thought that all these questions of drainage were matters of time. From his own experience gravel and clay took a long time to be drained, and when they got a tube, he supposed 70 ft. or 80 ft. down, it took a tremendous long time before that would affect a building situated as St. Paul's would be, something like 300 ft. from the tube. It might be forty or fifty years before it would have any effect. However, at present he had no data at all to give. He believed that Mr. Fox said he would drive a tube anywhere through London clay. Well, he had not had the experience Mr. Fox had and had only heard the remarks of people who were, he thought, competent to form an opinion—not engineers. Their statement was that they might pump in as much liquid grout as they liked round the tube in the London clay, but a large portion of it was dispersed and did not remain, and therefore they had round the tube a space which might form a drain—he did not say everywhere, but in certain localities. That was a statement he had heard from two or three competent people. The next point was that it was extremely difficult to exercise official supervision over this question of grouting. Who was going to do it? They could not have the architect put down there under compressed air, and who was to take the responsibility? A question was raised about the arches to the windows in the clearstory. He thought those round by the dome were very poor. He was rather inclined to believe that the voussoirs had been splayed since Wren's time.

Mr. Burnet said that in the photograph of the clearstory lights on the line of thrust the arched domes seemed to have been cut away.

Mr. Macartney said they had got no record at all. There was a question of the piers being braced up with iron tie-rods. There were tie-rods from the south portico to the end of the south transept running back almost to the dome, but he did not think they were placed round the piers in any way.

Mr. Dunn said they all knew that the impressions they got in their youth were the most lasting, and therefore he would not attempt to remove those which Mr. Stokes had gathered in his young days. Mr. Fox, an eminent engineer, surmised that someone had put these rings in after the building was up. They were, however, put in by Sir Christopher Wren, and he thought Mr. Fox would have found it difficult to have inserted them afterwards even under compressed air.

The Chairman announced that the next meeting, which would be a business meeting, would be held on December 2, when an election of members would take place, and the Council's proposal for the provision of a Charter and by-laws would be submitted to the general body.

EXCAVATIONS AT MYCALESSUS.

On Tuesday last week, before the Society for the Promotion of Hellenic Studies, at Burlington House, Professor Burrows gave an address on his excavation at Mycalessus in August and September, 1907. Professor P. Gardner presided.

Professor Burrows, whose address was illustrated by lantern slides, said there were few episodes in the narrative of Thucydides that impressed themselves so strongly on the imagination as the story of Mycalessus. The sudden attack on the defenceless city, the slaughter of women and children, the unexpectedness and completeness of the thing powerfully affected Thucydides himself. It was easy to follow the narrative on the spot. When Diitrephes left Athens with his 1,300 Thracians, too late to sail with Demosthenes to Sicily, and doubled Cape Sunium, they could sail with him as he passed Cropus and Eretria through the broader reaches of th Euripas, and see him on the flat coast by Dilisi as he landed and ravaged the coastlands that belonged to Tanagra. Diitrephes

made no attempt to land at Aulis, but went straight on to Chalcis, and apparently put in there for the night. If any rumour of these wild Thracians and their spasmodic landing on the coast of Tanagra was carried further north that night to Mycalessus or to Thebes, it brought with it no alarm, for if they were not men enough to ravage the rich level coastland of Tanagra for more than an hour or two, there was little to attract them further north. Mycalessus, the little town that lay on the Bœotian side of the mountain chain about a mile and three-quarters from the crest of the pass of Anephorites, the pass over which the main road ran, and must always have run, from Thebes to Chalcis, felt no alarm. It was truly, as Thucydides said, an inland town, though on one side it was little more than four miles from the sea, and was only six miles from Chalcis itself. But Diitrephes was not content with the bloodless ravaging of the Tanagra coastline. He left Chalcis after nightfall and landed his men further north-west at the nearest point to the Anephorites pass, bivouacking for the night at what Thucydides called the Hermeium, a shrine which, as Mr. Frazer suggested, may at that time have marked the legal as well as the natural frontier of Bœotia. Here he waited for early dawn to swoop down upon the town. He was probably not far from the crest of the Anephorites. From the top of Anephorites it took forty minutes to walk to the ground where the town must have been. That some ground near Rhitsona was the site of Mycalessus had long been certain, and Frazer's arguments against Leake and Baedeker, who placed it on the steep mountain of Megalo Vouno, were convincing. The positive archæological grounds which Frazer went on, however, were not so strong. There was no doubt that the ruins on the little hill on which he (Professor Burrows) encamped were largely Byzantine. They opened three foundation lines there, and one to the east side of the road, and they were all Byzantine. There was one group of ruins with unfluted round columns which clearly were the remains of a Byzantine church, and his own feeling was that nearly all the ruins in Bœotia which showed above the ground were Byzantine. There might possibly be ruins on the crest of the hill, but there was no evidence as yet. There was, he thought, one fairly certain Hellenic building in Mycalessus, and that was the wall which they excavated, the top of which was 18 in. below the soil. Two courses of fourteen blocks each had already been excavated to a length of 57 ft. The stones were worked, and there was no mortar or tiles. There was the further evidence of two figurine heads of Tanagra type, much damaged, but apparently Hellenic, one of which was found on the same level as the top of the top course, 3 in. from it on the inside, and the other actually on the wall. It might be asked why they were stopped digging, and the answer was not because of these walls, but because of their tombs. This ground belonged to sixty-nine peasants under joint ownership, and he could not get written leave to work. They got verbal leave, but when they opened tomb after tomb the peasants felt they must stop it! They thought it was all very well for archæologists to find things like walls and temples, but when it came to the question of tombs, that was too much. Those who knew the district knew also that the peasants were some of the most learned and skilled archæologists in the world. One of his chief assistants was the greatest tomb robber in the neighbourhood, and the reason which induced him (the speaker) to come to Rhitsona was because this man did not want him to come. When he found that he was really coming there, he showed him the group of tombs, which it would be impossible for him to dig in the night, as it was too near the road. There was a second group, and a third group which his assistant tried to keep him off, but there were things left about by the peasants which were obviously good. He had been talking confidently about Mycalessus, but they had found no inscriptions or coins. There was, however, all the topographical evidence and other points which made it sure to him. There were three groups of tombs, and they were not close together. Group A was 200 yds. east of group C, and group B 115 yds. east of group C. Therefore these three groups, if they contained the same sort of pottery, gave distinct evidence as to the character of the age they represented. It could not be mere coincidence that in these three groups there was absolutely nothing later than 500 B.C. Of all the sixteen tombs they opened, only one apparently was IVth century. Of all the hundreds of vases in their ten boxes and fourteen baskets only eleven pieces were later than the VIth century, and in all the wreckage they gathered nothing was later than the end of the VIth century. This harmonised with all they knew of the history of Mycalessus. The road from Thebes to Chalcis went by the town, and the failure of Mycalessus probably began just after their dominant date. Bœotia was in the VIth century closely associated with Chalcis, and Mycalessus by position was more closely connected with Chalcis than any other city. When Chalcis fell before Athens in 506, Mycalessus had its life cut off at the roots. It had been a centre on a great high road of commercial activity—the trade route from Chalcis to Thebes. The new commerce moved along the Euripus, and Thebes and Tanagra, so far as they had commerce outside their borders, traded by way of the Corinthian gulf. Mycalessus was in a side current now, when before it had been the halfway house between two of the greatest cities of Greece. Then came destruction when Diitrephes and his Boulgars crept down through the pine trees in the grey morning, and the wall was weak and partly fallen down, and the gate was left open, and the boys were all at school. Not, perhaps, so complete a destruction as Pausanias made out, but there was gradual decay till, in Pausanias's day, the place was in ruins, and remained so until the repopulation of Bœotia in Byzantine days. Professor Burrows proceeded to deal with the vases found a few months ago, which he said were obtained in large quantity. It was, however, impossible to give a complete description, as many were not pieced together. The dominant date was given by the two most interesting tombs, Nos. 18 and 22. The first was a rectangular oblong, 11½ ft. deep, and there was no stone slab. Most of the really ancient tombs in the district had no stone slabs, or any protection against the falling earth. In only one of the tombs was there a stone slab, and in that they found a perfect skeleton. In No. 18 tomb they found a piece of red figure. There were masses of black figure, mostly of coarse design with purple and white accessories, and in the same tomb masses of Bœotian geometric. These were large cups of coarse thick unglazed buff clay with geometric designs in red, yellow, and black, painted on without proper fixing, generally, if not always, on a white slip also not properly fixed. The colours rubbed off with the fingers as in similar terra-cotta figurines, such as Papades. There were always four handles on these examples. Closely allied to this geometric ware in design, though finer in fabric, were some Proto-Corinthian two-handled cups, with dark red bands round the body, and vertical straight lines just below the rim. With all these they had masses of Corinthian pear-shaped aryballi, and masses of cothons. The so-called cothons were flat bowls with turned-in rim to prevent liquid running out. They were certainly not for drinking, and the question might be asked whether they were for oil with floating wicks. In addition, they found numbers of figurines. There were two birds, one with red all over the back, and white neck, tail, breast, and feet, and the other white with a red band over the tail. Their height was 3 in., and length 4½ in. There was also a human head on conventional bust, 6½ in. high; the face was handsome. The colour was yellow powdery paint, with black eyes and red earrings, and red vertical and horizontal decoration on the head-dress which came right over the forehead. Then there was the reclining figure of a woman with the colour well preserved. The face and arms and border of the robe were red. That brought him to a most interesting and important point about these figurines. They found them much more coloured than those in the museums in Athens, the Louvre, and the British Museum. Most of these had come after great exposure to the air, and had reached the museum in a battered state. They were fortunate to get them at the tombs themselves, and they were at once placed in paper and stereo-chromatised with celluloid lac by Dr. Rhousopoulos. The most remarkable of these figurines was a naked man coloured bright red, except for his black hair and beard and white eyeballs. The figure was seated on a yellow stool, and the whole was on a white stand. In his left hand he had a hollow oblong article, open at two ends, which was yellow at the sides and black on top. In the right hand he was holding at an angle across this hollow oblong a small grey solid substance, and apparently grating it upon it. In front of him was a round dish with an erection on it like an unopened mushroom. It might be suggested that it was a pestle inside a mortar, but it was probably a cake or other confection he had made, and on which he was now grating cheese or sweet-stuff as a finishing touch; for immediately above the mushroom was a blob of white paint clearly meant to be irregular in shape, and patches of the same were to be seen on the edge of the hollow oblong. The white stuff was meant to be dropping on to the cake. Proceeding, Professor Burrows described a new polychrome cantharus of strange colouring, and remarked that about the end of the VIth century there must have been many experiments in polychrome. But could this polychrome experiment and one or two pieces of fine Red Figure be in the same tombs with Bœotian geometric and Corinthian aryballi, and cothons, and small vessels that might even be called proto-Corinthian? They might notice that this Bœotian geometric was much coarser than most hitherto described. Its brittleness probably meant that no private diggers touched it, and, indeed, it was found they did not. Practically all the Bœotian geometric which filled the museums was from private digging. In any case, it must be remembered that not in one grave, but in four graves, they found this mixture, and that photographs of one of the graves as opened, with the vases in position, made it certain that each of the graves represented a single interment.

Dr. Grenfell afterwards described some of the latest literary finds at the excavation of Oxyrhynchus.

THE ARCHITECTURAL ASSOCIATION.

AN ordinary general meeting of the Architectural Association was held on Friday last week at Tufton-street, Westminster, S.W., Mr. H. Tanner, jun., Vice-President, in the chair.

New Members.

The minutes of the last meeting having been read and confirmed and some nominations read, the following candidates were elected as members, *i.e.*, Messrs.

H. J. W. Etheridge, Streatham, S.W.
M. S. Daly, Caterham, Surrey.
J. A. Cheston, Hutton, Essex.
J. S. Annan, Mitcham.
W. S. Holt, Middlesbrough.
R. P. Annan, Mitcham.
J. R. Truelove, Sheffield.
F. C. Trench, Liverpool.
R. D. Elliott, Broxbourne, Herts.
P. D. Hepworth, West Hampstead, N.W.
J. W. Shaft, Harting, Petersfield.

Votes of Thanks.

On the motion of the Chairman, a vote of thanks was passed to Mr. Hugh Stannus for presenting a small collection of photographic negatives of Italian churches, and a vote of thanks to Mr. Herbert Batsford for presenting a view of old London, which would be hung in the museum.

The Relations of the Architect to the Builder.

The following papers, by Mr. B. J. Greenwood and Mr. J. S. Gibson, on "The Relations of the Architect to the Builder" were then read.

Mr. Greenwood said:—

"I am not sure where the line of demarcation is to be drawn between the subject of Mr. Gibson's paper and my own, and consequently I may inadvertently trespass upon his preserves, as he may on mine. It seems to me that a paper on "The Relations between Architect and Builder" would embrace both topics. However, if I trespass, I know of no game laws applicable to the case—at any rate, such trespassers cannot be prosecuted, though they may be persecuted.

It occurred to me that I might apply to your Secretary for a more definite delineation of the boundaries of my subject; but on reflection I concluded that a man acts

foolishly when he invites limitations. They can be of no advantage to him, and may be the contrary. So I am able to proceed with a sense of freedom of which you may possibly think I avail myself to a rather extravagant extent.

Let me say that the relations of the architect to the builder are, or should be, confidential. I do not use that word in the sense that these relations should be private—I know of no reason why the dealings between architect and builder should not be open to all parties interested, although not necessarily open to those who are not concerned—but I use the word "confidential" in the sense that between architect and builder there should be mutual confidence, otherwise their relations cannot be pleasant and are not likely to be advantageous.

The Element of Suspicion.

The element of suspicion with regard to the builder which pervades and permeates all building contracts need not be imported into the subsequent relations between architect and builder. Without adequate and unmistakable grounds the builder should not assume that the architect is striving to get 21s. for 1*l.*, and without similar proof the architect should not assume that the builder is scheming to give him 19s. for 1*l.* If in the course of a contract it occurs to a builder that some better method of securing a desired end can be adopted without detriment to the structure, and he makes to the architect a suggestion accordingly, there is no need for the architect to jump to the conclusion that the builder is seeking any unfair advantage, even if the improvement should afford some benefit to the author of it.

The builder in the course of his business has to employ all sorts and conditions of men—often through the fluctuations in trade, he is unable to know by experience the character and disposition of all those whom he has to place in positions of more or less control and responsibility; and, if in any cases such persons should act without his authority or knowledge in a manner that might be described as questionable, it does not follow that the builder is untrustworthy, provided that he is ready at once to rectify the fault and provide against its repetition.

I have known cases where work has been deliberately done badly and then reported to the architect in order to damage the builder's foreman.

It is not unreasonable to expect that architects, who have a comparatively small staff under their immediate supervision, should have some consideration for builders who employ hundreds of workmen who are only controlled directly by subordinates whom he has selected to the best of his ability. Of course, the direct responsibility for the acts of his employees rests with the builder; but the moral responsibility does not always follow, and I suggest that the relations of the architect to the builder should be free from any element of unwarrantable suspicion.

In the second place, the relation of the architect to the builder should be mutually beneficial.

Ideal Result of Building Contracts.

Neither party poses as a philanthropist: the architect expects, and rightly expects, that the contract shall enhance his own prestige and reputation, and gratify his clients; and the builder in his sphere has similar expectations. The architect expects, and rightly expects, that the contract shall be remunerative, and I imagine that he very seldom if ever fails to realise that expectation, although I have heard rumours that the remuneration is not always consistent with the professional ability and energy displayed. The builder also expects that the contract shall be remunerative; but in this case, unfortunately, his expectations are frequently doomed to disappointment, and it is no uncommon experience for the builder to contribute unwillingly, if not ungraciously, to the cost of the building.

Under the depressed state of the building trade that has prevailed during the past two years, I am afraid this experience has become lamentably common; but I think I may safely admit that builders need not be credited with motives of philanthropy in this matter, for if they contribute to the cost of their contracts, it is neither by desire nor intention, and it is not unusual for them to make laudable efforts to avoid such occurrences.

The ideal result of a building contract should be to the benefit of the client, the architect, and the builder, and, if in either cases this result is not attained, there is something wrong which should be rectified if opportunity arises, as it seldom does.

Variable Relations of Architect and Builder.

In the third place, the relations of the architect to the builder are variable—as variable as the wind "That bloweth where it listeth." This point opens a wide scope for comment, and I will, therefore, endeavour to abbreviate my remarks.

The relations of the architect to the builder are inevitably variable because of the widely differing characteristics and customs of the individuals concerned.

As to the varied individuality and customs of builders, I have very limited knowledge or experience. Builders are not particularly confidential amongst themselves; on the contrary, there is generally a considerable amount of reserve in trade relations, and the delightful theory that I believe was held at the London County Council some years ago, that builders were a happy family replete with confidence and mutual concern for each other, was altogether a fanciful apprehension. Recent experience leads me to think that builders may rather be likened to a pack of hounds when the scent is hot.

It needs a clever man to talk apparent sense on a subject about which he knows little or nothing (and there are such clever men to be found in the House of Commons if nowhere else). I therefore pass the inviting topic of the variable relations of the architect to the builder, arising from the varied characteristics of the builder. (Perhaps Mr. Gibson knows more about them than I do.)

I proceed on what is perhaps more delicate ground in this audience, viz., the variable relations of the architect to the builder arising from the varied individuality of the architect.

For instance, there is the autocratic architect; his relations to the builder are not as other men's. He is careful to emphasise the impassible gulf between the profession and the trade. When an audience is granted to the builder, it becomes him to proceed with great deference if not with awe. If the builder has opinions of his own, they must not be advanced, and suggestions or advice would be regarded as impertinence.

I remember hearing of an incident bearing on this point to which I may refer, although the architect in question was certainly not autocratic.

A certain limited liability company, newly-formed to work a more or less speculative patent, required certain work to be done. The builder called at the architect's office to agree the contract, and ventured to ask for particulars as to the subscribed capital of the company and its financial standing. He was informed by the architect's chief assistant that such a request was quite undesirable, and that it should be quite sufficient for the builder to know that the company was a client of his employer.

I imagine that if it was part of an architect's duty to guarantee the financial obligations of all his clients, it would in some cases be necessary to raise the scale of his fees.

The Legal Architect.

Then we may sometimes meet the legal architect. His relations with the builder are not the same as others; he has a patent pneumatic form of contract so constructed that by the movement of a simple lever, the commercial life of a builder is crushed out of him without any troublesome noise or struggle—a sigh, and he is gone! The architect carefully explains that he will never touch the lever—unless it becomes necessary. His variation orders are printed in elaborate and legal form; variation orders are issued for additions and omissions—chiefly omissions. If in foundations a good bottom is found at 3 in. less depth than anticipated, although in the process the builder has had to cut out concrete foundations at the price of ordinary digging, an omission order is promptly delivered. Unless official orders are secured for every extra, there is considerable doubt whether the work will ever be paid for.

I express here no opinion as to the desirability or otherwise of this rigid form of procedure—it undoubtedly has its advantages as well as disadvantages, for the legal architect is generally just, though his justice is not often tempered with the other thing.

Imagination and Exaggeration.

Now, I realise that it is becoming highly necessary that I should make an explanation—an important explanation, viz., that I am now indulging in imagination and exaggeration. This may seem to be a damaging confession, but let us examine it.

It would be highly improper and discourteous and quite foreign to my reputation and disposition if I were to come before you with any personal criticisms of individuals known to me, although my careful study of human nature leads me to the conclusion that in all probability the individuals I describe might be found if one searched long enough.

A romance is more entertaining than a history, and I judge that if this Association exists chiefly for serious study there is all the more reason why entertainment should occasionally take precedence, so please take it for granted that I am drawing upon my imagination, otherwise I should be too embarrassed to proceed.

I confessed to exaggeration as well as imagination. This latter may seem a more difficult matter to defend, but I assure you it is a virtue!

Let me endeavour to prove this somewhat enigmatical statement. Here are two short lines drawn on paper; they are apparently parallel, or nearly so. I want to ascertain the truth. Are they parallel or not? How am I to ascertain this? Exaggerate the lines; make them five times as long, and the truth becomes apparent.

A botanist has a certain theory with regard to the construction of a petal. A student has a certain theory with regard to the result of certain treatment on insect life. How can they test the truth of their theories? By exaggeration; they place their subjects under the microscope (which is just a mechanical exaggerator) and exaggeration undoubtedly contributes to the truth.

But you will, of course, perceive the danger of my proposition if it is unqualified, and the necessary qualification is that the exaggeration must be clearly admitted, that is to say:

Concealed exaggeration contributes to deception. Admitted exaggeration may contribute to the truth. My exaggeration comes under the latter definition; it is freely admitted.

Caricature is only exaggeration; but who will deny that *Punch* has a mission, and frequently conveys truth in a palatable and entertaining form. And there may be a modicum of truth in my remarks under the head of the variable relations of the architect to the builder, even though I am drawing on my imagination, and that with exaggeration.

By-the-bye, I must add that these remarks only apply to this particular division of this paper; all the other is intended seriously, I can assure you. Now to proceed, asking pardon for such a lengthy digression.

The "Easy-going" Architect.

There is the "easy-going" architect, and his relations to the builder are not as other men's. He gets out the contract drawings more or less accurately to a small scale, and virtually says to the builder: "Now I want a good job; get it done and don't bother me. Details! Make your own details," and, beyond an occasional detail on the cuff of his shirt, no more drawings are supplied. The specification is brief and leaves ample scope for the imagination. No agreements have been made with the adjoining owners as to party walls or ancient lights; "I always settle them as we go along," and the correspondence on the contract is virtually confined to the application for, and issue of, certificates. Such architects, if they have a good quantity surveyor and a good builder's foreman, often get through difficult contracts with marvellous success, but it is not always so.

The Scrupulous Architect.

As a contrast to the "easy-going" architect, let me mention the "scrupulous and painstaking" architect, who holds the builder in leading strings. The foundations of a garden wall must not be put in as shown on drawings before the bottom has been carefully tested. Elaborate details are issued

in profusion for every subordinate item; although it is true that, by oversight, a builder is sometimes allowed to use his own discretion as to the position in which the nails are to be driven in fixing an architrave moulding to a pantry door. I have known about 100 sheets of drawings to be issued for the construction of a small addition to a private house, and it makes me sometimes anxious as to whether such voluminous services are adequately remunerated.

Then there is the nervous architect who writes to his client to ask if he may issue a certificate; and then, through sheer nervousness and with no evil intent, retains twice the amount provided in the contract.

Rather than report a perfectly legitimate extra to his client he would offer to pay the cost himself, which the builder cannot permit, and consequently loses the money, and so on.

Vacillating Architects.

I must not omit to refer to the "vacillating architect." His relations to the builder are fortunately not as other men's.

It is sometimes difficult to satisfy the man who knows what he wants, but the labours of Sisyphus were but a trifle compared with the task of endeavouring to satisfy the man who does not know what he wants. First one portion of the works and then another is stopped pending further consideration, and the builder's foreman drafts his men from one point to another in his vain efforts to keep them employed.

I am afraid that even architects who have a thorough and practical knowledge of the trade are quite unable to appreciate the serious consequences to the builder of indecision in the issue of instructions. I may perhaps be able to convey some idea of the situation by the illustration of a railway engine.

By a certain expenditure of power the engine can draw its load from, say, Euston to Rugby without stopping, but if it has to stop at a dozen intermediate stations each stoppage involves a waste of power both in arresting and restarting the train, which means more wear and tear on the rolling stock and larger consumption of fuel, and this obviously involves increased cost.

In the same way, wher a builder has his contract started in good running order and has selected the proper number of workmen proportionate in each trade to work together without waste of labour, the work cannot be stopped here and there without throwing the whole machinery into disorder and causing a definite loss which it is exceedingly difficult to represent on paper in a definite form. Moreover, the builder himself loses grasp and control of his works. When a building proceeds regularly he is able to form his conclusions as to what stage should be reached at a given date, and if his anticipations are not fulfilled he can investigate the cause and possibly remedy the fault. But when he is told by the foreman that the work has been stopped or delayed at various points he discovers that, although his wages sheet is not reduced, the return for the wages paid is obviously reduced, and he is not in a position to remedy the evil, the general disorganisation of the works preventing any effectual supervision and control.

I have heard of an instance where more than a dozen different drawings were issued for the same portion of a building, and then when the surveyors came to measure the variation, not one of the drawings actually represented the work as finally executed, and they consequently had to measure from the work itself in order to be accurate.

There is a widespread opinion that variations are advantageous to a builder. Well, they ought to be, and possibly they may be if such variations are made at the commencement of the contract and then adhered to; but when these variations are made as the work proceeds, and involve hindrance and stoppage of portions of the work at various stages, then I unhesitatingly assert that they are a disadvantage to the builder unless they are valued at prices considerably above the prices that the builder set down in his estimate for work that was understood to proceed continuously without interruption.

It is, however, only fair to say that in many such cases the architect is not to blame, because he has a vacillating client who is really responsible for the situation.

Here, gentlemen, I expect that I have your sympathy. Architects are doubtless painfully familiar with the worry, anxiety, wasted time, and energy caused by the vacillating client who often fondly anticipates that his vacillation will cost him nothing (however much it may cost others), and is very wroth when he finds that this queer anticipation is not realised. When a client does not know what he wants he should not expect his work to be done by contract, but by daywork, or by an agreed percentage of profit on the cost, so that others are not made to suffer by his indecision.

I venture to submit that it is not equitable that work carried out under the conditions that I have faintly endeavoured to describe should be valued on prices that were submitted for work to be carried out under entirely different and more favourable conditions.

The relations between the vacillating architect (whether his vacillation is original or merely transmitted) and the builder are, I hope, always friendly, but they are inevitably accompanied by a certain feeling of resentment on the part of the builder which he more or less successfully conceals, although, alas, as the poet suggests, "concealment like a worm i' the bud preys on his damask cheek"!

Characteristics of Architects.

Now, I have ventured in a perfectly friendly and possibly humorous manner to refer to these exceptional characteristics of architects, or rather the characteristics of exceptional architects, in a more or less imaginary and exaggerated way, not for the purpose of criticism, but for two reasons.

(1) Because they directly affect the subject of my paper: "The Relations of the Architect to the Builder."

(2) So that you may grow sympathetic with the builder in his difficult position, and perhaps admire the consummate skill with which he sometimes steers his frail bark clear of the rocks which surround him.

That which would please one architect would offend another; that which one approved another condemns, and what is the poor builder to do? One architect will say, "I cannot pay for that extra work; you should have obtained a written order at the time; go and look at your contract." And in the next case, when the simple-minded builder refuses—no, not "refuses," but "indicates his unwillingness" to carry out verbal instructions until they are confirmed by an official written order, the architect regards this attitude as an imputation on his honour, as an inference that his word is not to be relied upon, and the innocent builder is regarded as a vexatious and litigious person. One architect likes his work to be carried out in a method that another architect condemns, and so on.

Now, there is nothing surprising or extraordinary in all this. It simply confirms my statement that the relations of the architect to the builder are variable in consequence of the varied individuality of architects.

But the builder still survives, and in an experience of over a quarter of a century I have had dealings with architects possessing, to a more or less extent, all the little peculiarities I have been bold enough to exaggerate, and I confess that in the long run the builder has more cause for satisfaction than complaint.

The Varied Individuality of the Builder.

But what about the varied individuality of builders? What do architects have to put up with?

I know very little about this matter, but I know that the architects have an effectual remedy that builders have not.

A builder must put up with the varied customs of architects; but architects can easily escape all these vexatious variations in builders by a very simple expedient which innate modesty makes me hesitate to indicate.

But the position I occupy here this evening calls for self-sacrifice, and begets a sense of duty sufficiently powerful to even overcome my timid modesty; so with blushes which may not be apparent externally, I suggest that all the vexatious variation in the customs and practices of builders might be avoided if all the architects in this honourable Association were to systematically place their contracts with the firm I have the honour to represent.

Judicial Relationship.

Having surmounted, or rather wriggled through the most delicate and dangerous part of my topic, I proceed with a sense of relief to remark that:

The relations of the architect to the builder are judicial.

When a professional man, or any other man is appointed, retained, employed, and remunerated by one party he is generally bound in honour to seek to protect and promote the interests of that party exclusively. But an architect holds a very peculiar and unique position, for his duty is not to promote and protect exclusively the interests of the person by whom he is appointed, and remunerated, and from whom he may expect further appointments, but to act impartially, judicially between his client and the contractor, who has nothing to do with his appointment or remuneration.

The position of an architect in this respect is obviously difficult if not contrary to nature, and can only be rightly held by men of high principles and honour. I say that it is an exalted tribute to the architectural profession that with so few exceptions this position is consistently held with such rectitude and integrity that one is accustomed to expect it as a foregone conclusion.

In this particular aspect the architectural profession seems to be placed on a higher pinnacle of honour and integrity than even His Majesty's judges; for, I suppose, that after a judge was appointed to try a case, if it was admitted that one of the suitors in the case had secured the judge's appointment and was providing his remuneration, I imagine that public opinion would declare that these facts would disqualify the judge from acting judicially. But in the case of an architect, public opinion raises no such protest, and he exercises his judicial functions under similar unfavourable circumstances with conspicuous honour and ability.

No one need wonder that architects holding such a position require an arbitration clause inserted in building contracts; for, under such circumstances, the responsibility of dealing judicially with all the different and varied situations that arise in the ordinary procedure of a building contract must be sufficiently onerous, and when questions or disputes arise on delicate issues in which the architect may be more or less personally and directly involved, it must be an unspeakable relief for him to be able to lay aside the responsibility of decision and refer the issue to some eminent and disinterested expert.

As I have already hinted, it is not every architect who fully realises the judicial relations of the architect to the builder; and there may be some new to the profession who have not yet entirely succeeded in putting aside the natural feeling that they are only the agents of the person or persons who appoint and remunerate them.

Co-operative Relationship.

I may mention in conclusion that the relations of the architect to the builder are, or should be, co-operative. They are both devoting their energies and abilities to a common end, and mutual assistance is of mutual benefit. The builder may render considerable assistance to the architect, and *vice versâ*, and this statement is so familiar that it needs no emphasis or illustration. The head cannot say to the hand "I have no need of thee," nor can the hand say to the head "I have no need of thee."

I imagine that the discussion on such papers as these will be far more interesting and entertaining than the papers themselves (I apologise to Mr. Gibson—I mean than *my* paper *itself*), and for this reason I will not occupy further time; but having merely introduced the subject, I beg that if in my brief and diffident remarks I have been in any way indiscreet, you will be generous enough to put it down to want of experience rather than want of courtesy and good feeling."

Mr. James S. Gibson, F.R.I.B.A., said:—

"Since promising to read a paper on this subject, which was selected by the Council of the Association, I have been endeavouring to find out what I had to say which was new and true and worth saying, and hope it has not proved an unprofitable search.

Somehow, the relations between the architect and the builder seem to be accepted by us without question or demonstration, just

like the laws of gravitation, and although we drift almost automatically into the acceptance of these relations, it may be that the younger men here will find the little I have to say helpful in directing their attention to what is one of the most important matters incidental to the practice of their profession.

The consideration of this subject implies the pleasant knowledge that the architect has secured a client; that he has prepared all his designs and written his specification; that quantities have been taken out. The builder then appears on the scene with his estimate and offers to erect the building in accordance with all these particulars.

Form of Contract.

So far all appears to be plain sailing. I will not at the present time touch on the trials and troubles of the architect, either with his client, his design, his specification, or the quantity surveyor, these are perhaps subject matter for a separate paper dealing with the woes and worries of an architect's career; and, as you will later inevitably experience them, it would be a species of refined cruelty to read you a paper about them at this early stage of your career. But, having surmounted all these initial difficulties, the form of contract is signed by the client and the builder, and everything is thereby in order for the work to be started.

The form of contract which will be signed in practically all metropolitan areas will be the form issued by the Institute, and everyone should know this form in a real sense; that is, you should know its meaning and purport, not its mere word, so that you may be able to act upon it when necessity arises. I would commend it to your serious consideration for the purpose of understanding its fairness and impartiality between all parties to the contract and realise the responsibility which it throws upon you as architect and as referee in all building operations.

Obligations Towards the Builder.

I should like to direct your attention to the practical obligations you have towards the builder to enable him to do his duty to your client.

The very first thing you must do is to supply the builder with a copy of the drawings upon which his contract is based; these, together with the specification and quantities, enable the builder to ascertain approximately the quantity and quality of materials and labour necessary to do the work. The drawings must be accurate, that is, they must be not only accurate in the sense that they fit the site of the buildings, but they must also be accurate in that they are workable.

This sounds like the utterance of a platitude, but I have seen plans supplied to a builder which showed that the site had either been wrongly surveyed, or never surveyed at all; in consequence all the plans had to be redrawn to fit the land. The levels should be accurately taken, and the design made to fit the contours.

Drawings.

The drawings should be workable; by that I mean that they should be practicable in construction; the points of support properly designed and worked out, the flues, staircases, and lift wells delineated from the bottom to the top, and nothing left to mere chance.

The drawings and specification should also be clear and unmistakable in their intention. A drawing which is incomplete, sketchy, or inaccurate is certain to lead to misunderstanding and perhaps to serious trouble. A specification which is ambiguous, or involved, or not sufficiently detailed, is sure to be a hindrance rather than a help.

We have now established three points; your drawings must be clear in their intention, accurate, and workable.

Requirements of the Authorities.

In addition to all this, your designs must be made so as to comply with the requirements of the authorities governing the building operations, and for the purposes of this paper I will suppose the buildings are to be erected in London. This necessitates, on your part, a thorough knowledge of the London Building Acts, and I consider it no mean feat if you can accomplish this, as the various Acts are so involved and complicated, and have been interpreted in such diverse ways, that it has become a matter of considerable difficulty to know exactly how far they are applicable to each building.

Within the metropolitan area you will often find it necessary to make special applications to the London County Council for such things as lines of frontages or building lines, projections of bays, oriels, balconies, and cornices, means of escape in case of fire, separation of parts of buildings, methods of construction, and a host of other things, which, if not applied for in time, will mean delay in the building operations. These special applications have to be accompanied by drawings, and often interviews and explanations have to be given to the authorities, and these things take up a great amount of time, and if you have not foreseen and provided for this the result will be that the builder may be stopped or cannot proceed as quickly with his work as originally intended, and so delays are caused for which the builder can in no sense be held responsible.

You all know how important it is that London work should be completed within the contract time; usually very heavy penalties are inserted in the contract for delays in completing, and I would impress upon you the obligations you are under to your client and the builder to make all the necessary applications to the proper authorities in plenty of time, so that the builder may be enabled to carry out his part of the contract.

We will, however, assume that you have secured all the necesary consents of the authorities, and the builder, therefore, starts the work on the best terms.

Full-size Drawings, etc.

The next matter that arises is to provide him with all further drawings, full sizes, and instructions from time to time so as to enable him to go on continuously with the works. You must remember it is the builder who is responsible for getting the structure erected within the contract time, and when he makes any reasonable request to you for additional drawings or instructions you should at once supply all he requires. I am afraid the architect does not always do this; he may be pressed with other matters, or not in the humour of doing that particular job; but any unjustifiable delay in providing the builder with drawings and instructions may be a very serious matter for the architect. It may appear to you that there is no particular hurry to make certain drawings; you think a few weeks later will probably suit just as well. But you must recollect that the builder has to make arrangements far ahead of the requirements of to-day, and you will rarely find that he asks for drawings without good and sufficient reasons for doing so.

Employment of Sub-contractors.

The next practical point I would direct your attention to is the employment of sub-contractors. As you know, sub-contractors, or specialists, are largely employed on all contracts. These are usually nominated by the architect or client, and carry out their works for the builder, who is responsible for them, and who is usually paid a percentage or profit on the amount of the sub-contracts. You may occasionally find a client who is desirous of omitting from the main contract a number of the sub-contracts, such as grates, electric fittings, sanitary goods, and decorative matters, and often this is done for the purpose of obtaining a portion of the discounts usually allowed to builders. On the face of it this appears a reasonable and equitable thing to do, that if the client can save for himself a builder's profit on sanitary goods, electric fittings, grates, etc., he is a wise man to do so; but you, as architects, must look at the equity of the transaction as between both parties.

There are two points in relation to the builder's claim for profit which demand your attention; say we are dealing with a contract for a house costing 5,000*l.* and which includes 750*l.* of provisional amounts. If the client expends these monies direct and saves 75*l.* by so doing he will certainly have to pay the builder, or some other person, for the handling, delivery, and fixing these goods, besides the establishment charges incurred in dealing with them. Now, in charges for fixing sanitary goods, grates, tiles, electric fittings, and such-like things, there is a possibility of a great diversity of opinion on values, especially if all discounts on the articles themselves have been deducted. It may be taken as an axiom that what the builder loses in discount he can make up in charges for materials and labour in fixing, etc. I always strongly advocate paying the builder a reasonable profit on all sub-contracts, varying from 5 per cent. to 10 per cent. on their value, as being the most satisfactory and equitable way of dealing with these matters.

The second point which claims your attention is this, the builder has been invited to estimate for a complete house to cost about 5,000*l.*, and the condition is implied, if not expressed, that the goods and labours included in the specifications for provisional amounts shall be supplied by the builder, and upon which it is only reasonable for him to calculate on obtaining a profit when making up the amount of his estimate.

As the builder is primarily responsible for the execution and maintenance of all the works, although he may, and almost always does, protect himself against the sub-contractor; it is sometimes the case that the builder has a proper objection to the appointment of a sub-contractor who may be nominated for certain works, and the architect should give the very greatest consideration to that objection before making any appointment. On the other hand, you must be extremely careful not to accept the nomination of any sub-contractor by the builder without first satisfying yourself that he is the proper person to be entrusted with your work, as no excuse will absolve you from liability to your client.

New Materials.

There are a great many matters in building operations, especially in the use and introduction of new materials, new types of fittings and appliances in which the experience of the builder may be of great service to us, and I have always found them ready and willing to put their greater experience at our service, and have frequently availed myself of it to the manifest advantage of the work. Life appears to be too short for us to obtain a practical acquaintance with the thousand and one inventions and materials that are brought before our notice by the patient and persevering gentlemen who climb our stairs and lie in wait for us on the doorstep to show us materials with which we have not even a bowing acquaintance, and weird inventions we can hardly understand.

Respecting the majority of these things, I am sure these gentlemen would do well to cultivate the builder more, and the architect less, and by doing so the time of all parties would be economised.

Variations on Originally Designed Works.

I believe it to be almost impossible to carry out mere building operations without variations on the originally-designed works, and I certainly believe it to be still more impossible to carry out works of real architectural merit without variations; but I must counsel you to deal with all variations in a business-like way. However small or unimportant the variations may appear to be, always give the builder an order in writing, or a letter, or a drawing, so as to make it quite clear between all parties that something is now proposed to be done which was not originally intended.

There are instances, many of them, in which you will have to give verbal orders when you are on the works, such as the depth and dimensions of foundations, the building of a pier in cement instead of lime mortar, the altered direction of a flue, or the course of a down pipe; but make a note of these at the time in your notebook, and as soon as you can thereafter put all these instructions in writing, and send them to your client and the builder. This will save everybody trouble in adjusting the accounts at the conclusion of the contract, and will free your mind from a lot of petty detail during its progress.

Whenever you possibly can, get the amount of these variations fixed before giving the order; you will find the quantity surveyor of great help to you in these matters, and get your client's approval of them, as he should always know just how matters stand

in relation to the contract. On the more important architectural works, you will probably have to do with the sculptor or carver, and, even in a minor matter like this, conclude all your consultations with him and get the modelling executed at the earliest possible stage.

It is astonishing how much expense and inconvenience and hindrance to the works can be caused just because the sculptor and the architect have not made up their minds how the decorative sculpture is to be treated. And when you reflect that the builder has to prepare everything for the sculptor to work on, to get the joints of the stonework in the right positions, so that a vertical joint does not come right down the middle of the nose of Diana, or a horizontal joint cut off her chin, and that all the joints must be worked back to depths to suit the carving, and a thousand and one other matters of a like nature, I am sure you will agree that equity to the builder necessitates on your part a large measure of foresight in dealing with the work.

Ethical Relations.

I turn now from the practical side of this matter to the more important one—the ethical relations of the architect and the builder—and desire to say a little on two aspects of this relationship. The first is between the architect himself and the builder, and relates to all the things involved in carrying out his designs as he desires. We all know that when we have prepared our designs these represent what, at the time, is our best ideas of how the building should be erected; but as the work advances, and especially if it is a large building, the erection of which takes one, two, or three years, fresh ideas come, and we modify and alter the original design in many ways. In this there is a strong temptation to the architect to get his later ideas carried out by the builder without extra expense to the client; but this temptation must be resisted where it is inimical to the fair treatment of the builder. Remember, we started out with a contract based on drawings which showed what we intended to build at that time, and if we subsequently change our ideas so that additional cost is incurred, we must see to it that the builder is recompensed for that extra cost. The architect is sometimes placed in a difficult position with his client; he knows that the later ideas are the best, and that his client expects the best that is in him, and the client is often against any additional expenditure. But the architect's clear duty is to lay before his client his later schemes and get his consent to these, instead of, as is sometimes the case, giving the builder instructions to do the work and risking his client's approval of the additional cost. In a great many minor things there will be variations, but we always find the builder willing to meet us in a reasonable way; a spirit of give and take on both sides enables an architect to get a better result for the client without incurring any loss to the builder.

Some years ago I heard of a firm of builders who kept a large clerical staff to go through all the drawings, specifications, and instructions of the architects for whom they worked, so that if a moulding girthed 9½ in. instead of 9 in. a claim for a variation would be made, without taking into account the fact that a moulding of 6 in. may be more costly to work than one of 9 in., owing entirely to its section. The result was inevitable; the cost of finding out these variations far exceeded any monetary advantage obtained, the confidence and sympathy of architects were alienated, and the firm passed out of existence.

I also knew an architect in the North who prepared his own quantities, this being a common practice there, and he used to measure up ordinary three-coat plaster work with such exactitude that every eighth of an inch was measured, with a result that he became the best-hated man in the town; and so you see there can be faults on both sides.

The Client and the Builder.

Perhaps the most important relation of the architect to the builder is that of seeing fair play beween the desires of the client and the obligations of the builder.

As a general rule clients are content to abide by the decision of the architect in all matters relating to the interpretation of a contract; but it sometimes happens that a client has misunderstood the contract or expects a great deal more from the builder than the contract warrants. Should this occur it is the duty of the architect to hold the balance fairly between both parties, and this has been so done by architects that they have obtained the confidence and respect of all reputable builders in these matters. It will be your privilege one day to carry on this fine spirit of justice and equity, and I am sure you will ever have before you the reputation and example of those who have always endeavoured to keep the architectural profession free from any suspicion of unfairness in all its dealings with clients and contractors."

Mr. Louis Ambler, in proposing a vote of thanks to the readers of the papers, said he had been very much interested in the lectures. Mr. Greenwood was very modest in saying that he took an exaggerated view in much that he said, and he made architects out to be almost ideal people, except in one or two cases, which he called exaggerated. He (the speaker) was not quite sure that Mr. Greenwood's criticisms were so much exaggerated, and what Mr. Greenwood called his extreme cases were, he (the speaker) was afraid, often occurring. One heard of numerous true instances such as had been referred to. He knew of one case which he could mention as to a very busy architect who, as soon as he secured one work, which he got in competition—which was to his credit—immediately set to work on another competition, and the consequence was that he could not and did not spend that time in making detail drawings and in superintending the erection of the building which the ordinary architect considered necessary; and one builder who had put up one or two buildings for that architect told him (the speaker) that that architect usually visited his buildings about twice or three times during the course of their erection, and then he spent half an hour lolling against the scaffolding having a little chat with the builder. In another case the builder thought he would take a rise out of this architect, who was a country practitioner and took out his own quantities, and said: "Oh, you have forgotten one thing!" The architect asked what that was, and the answer he got was: "Oh, you have forgotten to take the quantity of string required to hold up the mullions!" A good deal was said about the difficulties architects had with their clients, but that was really beside the scope of the papers; however, it was one of the reasons for what Mr. Greenwood had called vacillation. It was generally the client who was undecided and who made the architect appear to be undecided. As to the individuality of builders, that differed quite as much as did the individuality of architects. There were builders who gave the architect no trouble at all, and builders who seemed to make trouble the whole time from beginning to end. One heard of cases of builders who, within the first week of signing the contract, not only required the ½-in. details, which he thought they ought to have very shortly after, but who asked for full-sized details of the whole building, and demanded them within a fortnight, and said that if they did not get them they would be delayed in carrying out the work, and would require an allowance for additional time. As Mr. Greenwood said, the suggestions made by builders as to variations were usually in their favour or to their advantage, though they might also be to the advantage of the building. There were a great many ways of carrying out a contract. Some builders seemed to think that they must write letters every day or two, or even once or twice a day; others hardly ever wrote except to acknowledge the receipt of a detailed drawing or instruction or to apply for a certificate. So that there were extremes in both cases; some builders made everything easy for the architect, and others made it most difficult. What always seemed to him to be a very important thing in regard to carrying out contracts and as to whether builders found them remunerative or not was whether they carried them out quickly. It often happened that there were so small a number of variations in a building work that practically it was erected as drawn and specified, but it was a very rare event to find that the building was carried out straight away without any delay whatever. One heard of such cases, but the general result was that there was delay in completion, and one found that builders were very often behindhand in ordering things which they might have ordered months before, whereas they waited until they actually wanted the material before giving the order. That often created a difficulty, for the goods that came on to the job might or might not be what the architect wanted, and if they had to be condemned delay was occasioned. Time was the essence of the contract, and unless the builder completed the contract within the specified time or a reasonable extension of the time, he could not hope to make the result remunerative to himself, and as a rule it was not remunerative to the architect, for it was quite certain that he would have to make many more visits of superintendence and have a lot of extra trouble in connexion with the work. One heard of such cases as the making of 100 sheets of drawings for some small addition to a house, but very rarely, and perhaps that was really an exaggeration on Mr. Greenwood's part. That would not be remunerative to the architect, and it was clearly unnecessary. Mr. Gibson covered the whole ground so thoroughly as to the relations between architects and builders that there was little left to be said, but it might be inferred that he had an ideal lot of builders to do with, and they must congratulate him if that were so.

Mr. Guy Nicholson, who seconded the vote of thanks, said the papers were very interesting, in addition to being humorous. Mr. Greenwood suggested that suspicion was or should be uncalled for between the builder and the architect. That was a beautiful vision which suggested the lion and the lamb lying down together. He did not think architects were entirely responsible for the occasional suspicion there was, for the architect really did find now and then that if a long interval elapsed betwen his visits, and if he was not represented by a clerk of works, that materials of a certain kind did get put in by some extraordinary oversight. As a rule it was the foreman's fault, and, of course, the builder did not approve at all, and was most indignant about it; but he was more indignant still if the work had to be taken down and done over again. If it got passed, the foreman had been known to receive congratulations after the departure of the architect. As to unremunerative contracts, he was sorry for the architect in many instances, for it seemed to him an absolute impossibility for their work to be remunerative in some cases. On small houses he did not see how they could make a profit unless all the houses were to be alike and the details could be used over and over again. But builders were responsible for their own unremunerative contracts, for the prices they put in in tendering were obviously often impossible. A little time ago he dealt with a contract the engineer's estimate for which was 17,000*l*. His firm said they thought the work could be done for 16,000*l*., though the engineer said they were very sanguine; but a builder tendered at 14,000*l*., and from the priced bills they saw that he had added nothing to the provisions, and that he had taken off 10 per cent. from his summary! How could he expect the contract to be remunerative? That was the result of the unlimited competition of the present day, and he thought that where possible builders should be selected in competition. It was not fair to first-class firms who had a reputation for honestly doing good work to be put in competition with outsiders with no reputation except for scamping. In the case of public bodies perhaps there was no option; they were not allowed to select builders, and they had to put work out to open competition. Among builders themselves a lot might be done to avoid this unremunerative competition by all the best firms—all the firms belonging to the Master Builders' Association—agreeing not to tender below cost price. As to vacillating architects, that was generally the fault of the client, even sometimes the Government. He knew one client who gave instructions to the architect, and the plans had to be drawn three times before they were finally settled—the client did not expect to pay for that—and even then the work had to be stopped again because the client had changed his mind. In another case—a large Government contract—the work was altered

considerably in the process of carrying out the contract, and at the end the contractor made a claim for extension of time. The matter went before a Government official, who was the arbitrator, and he said he could not see that the contractor was delayed, for all the alterations were made as the work was going on, and could be made while the other work was progressing, and it could not, therefore, make any difference to the contractor. Alterations were very costly, and he had known clients object that they did not intend to pay more than once for the building, and if work was done twice over they did not see why they should pay. In the same way, a customer who had ordered a suit of dress clothes might change his mind after they were made, and order a Norfolk suit instead, but if he offered to pay only for the Norfolk suit the tailor would hardly be satisfied. As to valuing variations, having once entered into a contract obtained in competition, it was not fair to the other builders to make concessions on the contract, for if the unsuccessful builders had known beforehand that the schedule would not be binding they might have sent in a lower tender. It was only fair that when there was a fixed schedule that that schedule should be adhered to, and if that were not done, then there was no fairness in the competition at all. As to architects having sympathy with the builders, he thought they had a great deal. Architects generally had more sympathy with builders than clients had, because the architects knew more about the difficulties of the work; but the clients expected the work to be done at the stipulated price, and the architect bore the brunt of it if there were extras. As to the arbitration clause, it was far better to nominate another arbitrator. Those contracts were a mistake in which either the architect or the engineer was the arbitrator on his own work, for it was impossible for a man going through a contract not to form an opinion on the rights and wrongs of the matter; and once he had formed that opinion he was unfit to be arbitrator, for an arbitrator should have an unbiassed mind. Mr. Gibson had referred to the necessity of having accurate plans; that was valuable advice, and he did not think it saved time, however anxious a client was, to rush the plans through. Often plans that were prepared in a hurry were returned by the quantity surveyor covered with notes: walls on upper floors had no support, or there was no apparent means of access to certain rooms, etc. That was all the result of the tremendous pressure of the times, but it did not save time, for it gave rise to many queries, and the builder had to bother the architect incessantly, and it resulted in many variations. Mr. Gibson suggested that if an architect succeeded in understanding and in mastering the difficulties raised by the London Building Act he showed great ability. He (the speaker) thought so too, for they did not find the District Surveyors agree with one another on the interpretation of the Act, and they did not always find the same District Surveyor give the same decision twice running. As to sub-contracting, it had become a very favourite practice of clients to order certain things required in the erection of a building, because they had discovered, or thought they had discovered, that there were certain trade discounts to be secured; but it was nearly always disastrous for them to do so. One client who thought he could save the discount on wall-paper ordered what he wanted; but, as the builder was not responsible for the custody of it or for its economical use, each room took double the quantity of paper it would have done under ordinary circumstances. It was not a saving, therefore, and the same sort of thing had happened in ironmongery, etc. No one was responsible for the goods, and they got rusty or damaged, and a lot of bother resulted as to who was responsible. The client was responsible if he ordered goods, and he made a great mistake generally in supposing that he saved money by doing so. Again, if the builder ordered the things he paid for them, and was the one man to deal with, and who was responsible to the merchants, whereas when the client ordered them all sorts of liabilities arose; and if a builder in these circumstances went bankrupt all kinds of claims might be made against the client. It was an important matter when giving orders for variations to let the client know what was proposed and how the contract stood. The variation orders if numbered clearly right through saved a lot of time and trouble in the adjustment of accounts at the end. The client knew how the thing was going on, and he did not have a disagreeable surprise at the end of the work as he did when there was no system in the orders and when the architect did not know how he stood in relation to the contract. As to what Mr. Ambler said about orders being given to merchants as soon as possible so as to get the materials on the site, it was an advantage to do so generally, but sometimes it was a disadvantage; as, for instance, if the architect wished to make any alteration in the work. If the material had been ordered already the builder might ask for some allowance for taking it into stock.

Mr. Clapham said there was one way in which architects could help builders, and that was by not keeping them waiting for drawings; besides, it helped architects also if drawings were got out quickly. When this was not done it was not always because of vacillation on the part of the architect, but rather to forgetfulness.

The Chairman, in putting the vote of thanks to the meeting, said that architects, like builders, differed a good deal, and the relations between them differed with each work. The chief duty of the architect was to hold the balance evenly between the client and the builder, but that was not always appreciated by the client, as he realised once when a client told him he was not acting for the builder, but for the client, and that he must get all he could out of the builder. He (the speaker) replied that that was not the way architects acted, but that they guarded their clients' interests, and saw that the contract was properly carried out. He thought, with Mr. Gibson, that on the whole the relations between the builder and the architect were very satisfactory. He had had very little trouble, and he found builders easy to get on with. He quite agreed that in inviting tenders builders of the same class ought to be asked to compete, otherwise it was no competition at all, and one often got the man one did not want.

The vote of thanks having been heartily agreed to,

Mr. Greenwood briefly replied. When he spoke about the element of suspicion between builders and architects he referred to unwarrantable suspicion, and he quite agreed that sometimes suspicion was justified. As to it being the builder's own fault that contracts were sometimes unremunerative, he was again in agreement, for frequently a builder tendered too low; but there were cases where a contract which ought to be remunerative became unremunerative through no fault of the builder. He thanked them on behalf of the trade which he represented for the sympathetic way in which his paper had been received and for the friendly references made to builders that evening.

The Chairman stated that the next meeting will be held on December 6, when Mr. Paul Waterhouse will read a paper on "Laying Out London."

The meeting then terminated.

COMBINED DRAINAGE:

THE PROPOSED NEW BILL.

THE Committee of the Conference of representatives of the City and Metropolitan Borough Councils on Combined Drainage have drafted a Bill to amend the Metropolis Management Acts with regard to sewers and drains. The Bill consists of two clauses, as follows:—"(1) In and for the purposes of the Metropolis Management Acts, 1855 to 1899, and the Public Health (London) Act, 1891, or any Act or Acts amending the same, the word 'drain' shall be deemed to include any sewer or drain, whether constructed before or after the passing of this Act, with which two or more houses or premises (whether belonging to the same or different owners) are at the date of the passing of this Act or may at any time thereafter be connected or which is used or capable of being or intended to be used for the conveyance of the drainage of such houses or buildings directly or by means of any other sewer or drain to any public sewer, but shall not include any sewer which has been constructed as a sewer to the satisfaction of the Corporation of the City of London, the London Council Council, the metropolitan borough councils, or their respective predecessors, or any sewer which has been constructed by any of those authorities at the public expense. (2) This Act may be cited as the Metropolis Management Amendment Act, 1907, and shall be construed as one with the Metropolis Management Act, 1855, and the Acts amending the same."

Copies of the measure are being sent to all the metropolitan borough councils with a request for support. It may be remembered that the Conference was convened by St. Pancras Borough Council, and met on June 24 last. The President of the Local Government Board (Mr. John Burns) has signified his readiness to consider any measure dealing with the subject which may be introduced on behalf of the metropolitan borough councils. The Committee of the Conference, which arranged the details, has adopted, as will be seen, sect. 42 of the West Ham Corporation Act, 1898, as being adapted to the requirements of the metropolis.

In a memorandum the Committee explain that the object of the Bill is to amend the unsatisfactory state of the law relating to combined drainage. Under the present law if a builder, owner, or occupier, without the knowledge or consent of the local authority, has caused a pipe to discharge from one premises into another or has caused a subdivision of the premises, after six months the combined drain becomes a sewer vested in the local authority, which cannot divest itself of the responsibility for its perpetual maintenance unless the authority can prove that the combination was made without their knowledge or consent. If a drain takes the drainage of more than one premises it becomes a sewer, whether the additional drainage was an original construction or subsequent addition, and in every such case the local authority must prove a negative, if they hold it is not a sewer, by producing a sanction or approved plan of the actual work done. In the opinion of builders, owners, and local authorities, combined drains were originally constructed as drains, and were mutually regarded as such until the retrospective case of Travis *v.* Uttley (1893), the effect of which has been to convert thousands of drains which had been privately owned and maintained into sewers vested in the local authorities and maintainable at the expense of the ratepayers. The Committee point out that the present state of the law is a stimulus rather than a check to persons converting drains into sewers by diverting the drainage of one house into another. The effect of the law is to reward owners, builders, or others who succeed in escaping the vigilance of local authorities by relieving them of their responsibilities and casting the expense on the ratepayers. In a recent case the Lord Chief Justice remarked that some amendment of the law in this matter seemed essential, and Mr. Justice Channell, in the case of Heaver *v.* Fulham Borough Council (1904), said: "It is unreasonable and perfectly ridiculous to say that because a thing is so constructed that the water of one roof has been observed to get down another person's stack-pipe that the stack-pipe becomes a drain repairable by the public at large." But in Holland *v.* Lazarus (1897), where an order was made by the vestry for the drainage of four houses by a combined operation, and a pipe which carried rain-water from the roof of a fifth house was turned into and connected with the combined drain, it was held that the rain-water pipe was a drain, and that its unauthorised connexion with the drain of the four houses converted it from the point of junction onwards into a sewer. The Court of Appeal upheld this decision. The Committee remark that during recent years an increasing interest has been shown in public health work, which has resulted in the passing of several Acts of Parliament giving the local authorities greater powers in dealing with the abatement of nuisances. In carrying out these compulsory Acts many defects in existing drains and sewers have been brought to light, and these have in some way to be remedied. In many cases costly works have to be executed, and consequently the distinction between drains

and sewers is of great importance, the cost falling upon the owner in the case of a drain and upon the local authority in the case of a sewer. It was estimated that the cost incurred by the ratepayers of London in reconstructing sewers due to combined drainage amounted during the three years 1904-6 to more than 65,000*l.* Even this large expenditure does not represent the whole, because in several of the boroughs separate accounts are not kept. It is certain that the liabilities will continue year by year, for owners of property are daily becoming more acquainted with the legal position, and more ready to take advantage of the difficulties which local authorities experience in proving the liability of the owners for the works. The burden is the more inequitable when it is remembered that these liabilities strictly pertain to private owners, the result being that a heavy and unjust burden is cast upon the ratepayers instead of upon those who in equity should bear it. Having regard to these facts it is unaccountable, says the Committee, that while metropolitan local authorities have been unable to obtain the required relief, several provincial authorities, notably West Ham, Croydon, Carlisle, Leyton, Wood Green, Sheffield, etc., have been successful in obtaining protective powers.

The Committee appended the section in the West Ham Corporation Act dealing with the matter. It was as follows:—"Sect. 42.—In and for the purposes of sect. 41 of the Act of 1893 the word 'drain' shall be deemed to include any sewer or drain, whether constructed before or after the passing of this Act, with which two or more houses or premises (whether belonging to the same or different owners) are at the date of the passing of this Act, or may at any time thereafter be connected, or which is used or capable of being or intended to be used for the conveyance of the drainage of such houses or buildings directly or by means of any other sewer or drain to any public sewer situate under a street repairable by the inhabitants at large, but shall not include any sewer which has been constructed to the satisfaction of the Corporation under sect. 152 of the Public Health Act, 1875, or any sewer which has been constructed by the Corporation for the effectual drainage of the borough."

The London Borough Officers' Association have sent a circular letter to the metropolitan borough councils on the subject of the proposed Bill relating to combined drainage. They express the opinion that the clause defining a "drain" should follow the definition contained in sect. 250 of the Metropolitan Local Management Act, 1855.

THE PORTA PALIO, VERONA.

THE name of Sanmicheli is connected with a distinct epoch in the history of the Italian Renaissance, and of his work the Porta del Palio is a striking and typical example. In this building, almost more than in any other of his works, is expressed what must have been the master's fundamental principle, viz., the supreme importance of noble proportion and composition in any architectural work. The main points of interest are the great Doric entablature—of which the detail is wonderfully refined, in spite of its huge size—which runs unbroken through the whole composition; the heavy rustication of the façade towards the city, and the great keystones, plain and square on that side and carved with heroic heads on the elevation towards the country. Here also the entablature is brought much lower, and so there are flat arches over the openings instead of semicircular ones. Internally there is a great rectangular hall, roofed with a groined vault in brick, which has a very impressive effect.

The Porta Palio forms one of the openings in the massive line of fortifications of Verona, and was erected towards the end of Sanmicheli's career, being completed in the year 1557.

MAURICE LYON.

BOARD SCHOOL, DALKEITH.—A new school has been erected by Newton School Board at Dalkeith. It is equipped for 300 scholars and contains five class-rooms, a central hall, and staff-rooms. The school has been built to the plans of Mr. J. A. Carfrae, architect, Edinburgh. The estimated cost of the school and equipment is 4,000*l.*

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring-gardens, S.W., Mr. H. Percy Harris, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Stepney Borough Council 20,000*l.* for electric lighting, and to sanction the borrowing of 10,000*l.* for street improvements by Westminster City Council.

Improvement.—On the adjourned recommendation of the Improvements Committee, and after discussion it was agreed:—

"That the supplemental estimate of expenditure on capital account of 19,000*l.*, submitted by the Finance Committee in respect of the widening of Camberwell New-road, be approved.

That negotiations be entered into for the acquisition of Messrs. Watney, Combe, Reid, & Co.'s freehold interest in the part of the "Athenæum" public-house needed for widening Camberwell New-road, and that negotiations be also entered into for the disposal of the leasehold interest, etc., in the part of the property not needed for the improvement."

The Area for London Building Wages.—Mr. Johnson asked whether it was a fact that the General Purposes Committee had resolved to reverse the recommendation which they brought up a few weeks ago for restricting the area in which the London rates of wages in the building trade should apply.

Mr. Sankey said the Committee had not come to any decision, but the matter had been deferred for further consideration.

Mr. Gilbert asked if it was not correct that the matter would not be considered again.

Mr. Sankey said he believed the matter would again be considered.

Tramways.—The Highways Committee recommended:—

"(*a*) That a notice in writing, under the seal of the Council, be served upon the Metropolitan Electric Tramways, Ltd., requiring the company to sell to the London County Council, under the conditions and in the manner provided by sect. 43 of the Tramways Act, 1870, the portion in London of the undertaking authorised by the Harrow-road and Paddington Tramways Acts, 1886, 1891, 1893, 1894, 1903, and 1904.

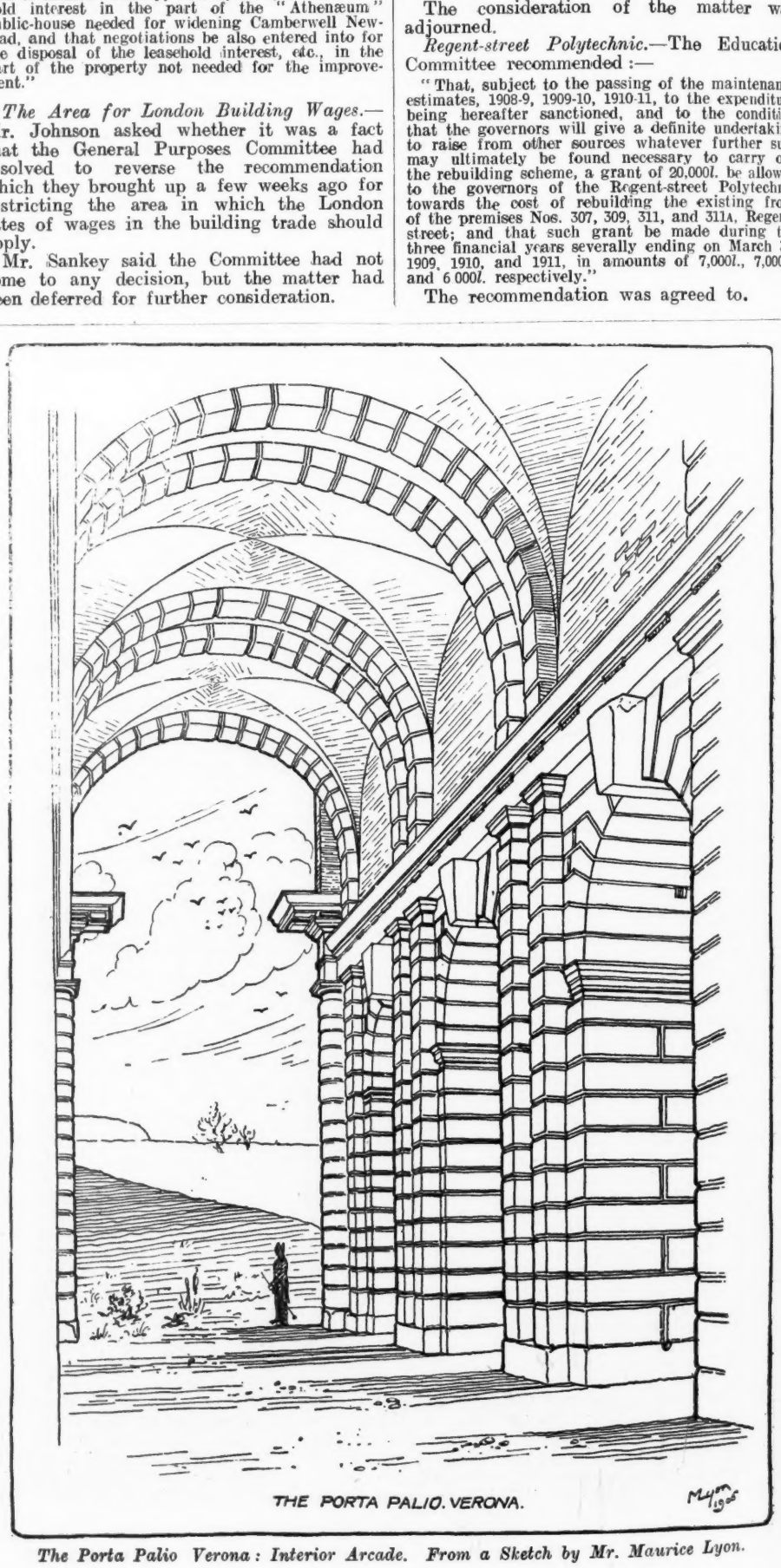
(*b*) That the clerk of the Council do apply to the Board of Trade for its approval of the foregoing resolution (*a*), and that he do, so soon as the Board of Trade shall have signified its approval, serve upon the Metropolitan Electric Tramways, Ltd., the notice referred to in the said resolution."

The consideration of the matter was adjourned.

Regent-street Polytechnic.—The Education Committee recommended:—

"That, subject to the passing of the maintenance estimates, 1908-9, 1909-10, 1910-11, to the expenditure being hereafter sanctioned, and to the condition that the governors will give a definite undertaking to raise from other sources whatever further sum may ultimately be found necessary to carry out the rebuilding scheme, a grant of 20,000*l.* be allowed to the governors of the Regent-street Polytechnic towards the cost of rebuilding the existing front of the premises Nos. 307, 309, 311, and 311A, Regent-street; and that such grant be made during the three financial years severally ending on March 31, 1909, 1910, and 1911, in amounts of 7,000*l.*, 7,000*l.*, and 6 000*l.* respectively."

The recommendation was agreed to.



The Porta Palio Verona: Interior Arcade. From a Sketch by Mr. Maurice Lyon.

Tar-paving of Playgrounds.—The Education Committee reported as follows :—

"The Council on July 31, 1906, accepted the tenders of (i.) Messrs. A. C. W. Hobman & Co. for providing, laying, repairing, etc., tar paving in the playgrounds of London County Council schools north of the Thames, and (ii.) Messrs. Chittenden & Simmons for similar work at London County Council schools south of the Thames, according to a schedule of prices.

The contracts were entered into on August 22, 1906, for a period of one year in the first instance, and were to remain in force thereafter until determined by three months' notice on either side. On July 17, 1907, we decided to terminate these contracts and to invite new tenders on a revised schedule by public advertisement. This schedule contains eleven items, and the contractors have been asked to quote three prices, namely—(i.) for work in the whole county; (ii.) for work north of the Thames; and (iii.) for work south of the Thames.

Tenders from the undermentioned firms were referred to us on October 22, 1907: Aylesford Sand and Stone Quarries Company, Ltd., 6, High-street, Rochester; Brunswick Rock Asphalt Paving Company, 9 Gracechurch-street; Chittenden & Simmons, Ltd., West Malling; Constable, Hart, & Co., Ltd., Clarence House, Arthur-street West; Fry Brothers, Lion Wharf, Greenwich; A. C. W. Hobman & Co., Cliftonville, South Bermondsey; J. J. Ingham, Valley-road, Bradford; Northern Asphalt and Roofing Works Company, Queen Anne's-chambers, Westminster; Roadamant Company, Ltd., 373, Queen's-road, Peckham; W. Sharpe, 105, Sirdar-road, Wood Green; J. Wainwright & Co., Ltd., Shepton Mallet.

As a basis of comparison we have taken the works in connexion with tar paving executed during the year ended September 11, 1907, and the cost has been calculated at the prices submitted by each firm tendering. The prices thus obtained are set out in a manuscript statement which will be laid upon the table. The result of the comparison is that the lowest tender is that of Messrs. Chittenden & Simmons, and the second lowest that of Messrs. A. C. W. Hobman & Co., as under :— (i.) For work in the whole county—Messrs. Chittenden & Simmons, 4,805*l.* 15s. 6d.; Messrs. Hobman & Co., 4,816*l.* 19s. 10d. (ii.) For work north of the Thames—Messrs. Chittenden & Simmons, 2,341*l.* 9s. 10d.; Messrs. Hobman & Co., 2,374*l.* 7s. 11d. (iii.) For work south of the Thames—Messrs. Chittenden & Simmons, 2,494*l.* 2s. 10d.; Messrs. Hobman & Co., 2,584*l.* 17s. 9d. In consequence of the large amount of work to be done, and in order to avoid delay in carrying it out, we are of opinion that, following the precedent of last year, contracts should be entered into between two firms. We accordingly propose that the tender of Messrs. Hobman & Co. shall be accepted for work to schools on the north of the Thames, and that of Messrs. Chittenden & Simmons for work to schools on the south side.

The schedules of prices submitted by these contractors are set out in the statement separately submitted by the Education Committee on November 19, 1907, representing the prices submitted by (i.) Messrs. Hobman & Co. for work north of the Thames, and (ii.) Messrs. Chittenden & Simmons, for work south of the Thames.

A comparative statement in manuscript will be laid upon the table showing the prices submitted by the two firms in question in 1906 and those now submitted for (i.) work to schools north of the Thames, (ii.) work to schools south of the Thames, and (iii.) work to schools in the whole county.

We recommend that the tenders of (i.) Messrs. A. C. W. Hobman & Co. for providing, laying, and repairing, tar paving in the playgrounds of London County Council schools north of the Thames, and (ii.) Messrs. Chittenden & Simmons for similar work at London County Council schools south of the Thames, according to a schedule of prices, be accepted; that the contract, in each case, be for a period of one year in the first instance, and do remain in force thereafter, until determined by three months' notice in writing by either party, such notice to expire at any time; that the solicitor do prepare, and obtain execution of, the necessary contracts; and that the seal of the Council be affixed thereto, when ready."

The recommendation was agreed to.

Theatres, etc.—The following proposals, recommended by the Theatres and Music Halls Committee, were agreed to :—

"Alterations at the Lyceum Theatre, Wellington-street (Mr. E. Bates).

Pay-box and a pair of draught doors at the New-road entrance lobby to the Royal Assembly Rooms, Woolwich (Mr. G. R. Habershon).

Seating arrangements for the St. Mary Magdalene Parish Hall, Trinity-road, Wandsworth Common (Mr. C. A. Adams).

Building to be erected in Lessingham-avenue, Tooting, and to be known as the Tooting Skating Rink (Mr. E. L. Ellis)."

The Building Act.—On the reception of the report of the Building Act Committee Mr. Phillimore asked the Chairman whether he had seen in the annual report on factories and workshops for 1906 a statement from one of the lady inspectors that the introduction of the new Building Act had brought about a better class of non-textile factory in the West-end, and would he continue to carry on the work of the Building Act Committee as far as possible to improve the workshops and factories in all parts of London.

Mr. Goldsmith, in reply, said he had not seen the report to which the hon. member referred, but the lady inspector who wrote it must have a very vivid imagination.

New County Hall—Assessing Designs.—The Establishment Committee reported as follows :

"The conditions governing the competition for designs for the new County Hall provide that the competitors in the final stage shall vote for the third assessor to act with Mr. Norman Shaw, R.A., and Mr. W. E. Riley, F.R.I.B.A., in assessing the designs in that stage, and the Council has approved the necessary expenditure (2,100*l.*) for a fee of 1,050*l.* each to Mr. Shaw and the third assessor. The result of the voting of the twenty-three competitors in the final stage shows that the highest number of votes was cast for Sir Aston Webb, R.A., to act in the capacity referred to. Sir Aston Webb, with whom we have been in communication, has sent a letter to the effect that, whilst "fully sensible of the great responsibility involved," he has pleasure in agreeing to act as one of the three assessors.

It is necessary to hire accommodation in connexion with the work of assessing the designs to be submitted by the twenty-three competitors in the final stage of the competition for the new County Hall. Suitable accommodation in a central position can be obtained at the medical examination hall, Victoria Embankment. The charge will be about 30*l.* a week. We understand that from three to four weeks will be occupied in assessing the designs, which are to be delivered not later than December 30, 1907, and after the final adjudication we think that members of the Council should have the opportunity on two or three days of viewing the designs, and that the public should be allowed to inspect the designs during a subsequent week.

We propose that the accommodation should be hired for five weeks with the option of continuing for a period not exceeding two additional weeks. A sum not exceeding 35*l.* will be required to cover expenses connected with the hire of screens, unpacking, packing, and carriage of designs, etc. The total sum required therefore is 245*l.*, which can be met out of the estimate of 1,000*l.*, approved on July 30, 1907. We recommend that expenditure on capital account not exceeding 245*l.* be sanctioned for hiring accommodation and screens and incidental expenses connected with assessing designs in the final stage of the competition for the new County Hall."

Sir M. Beachcroft, on the reception of the report of the Establishment Committee, asked when they were likely to have a report on the question of the new County Hall.

Mr. R. A. Robinson said that a report would be presented without any delay. The Committee were only carrying out the orders of the Council. The designs were being examined by the assessors, and they could not hurry them in their work.

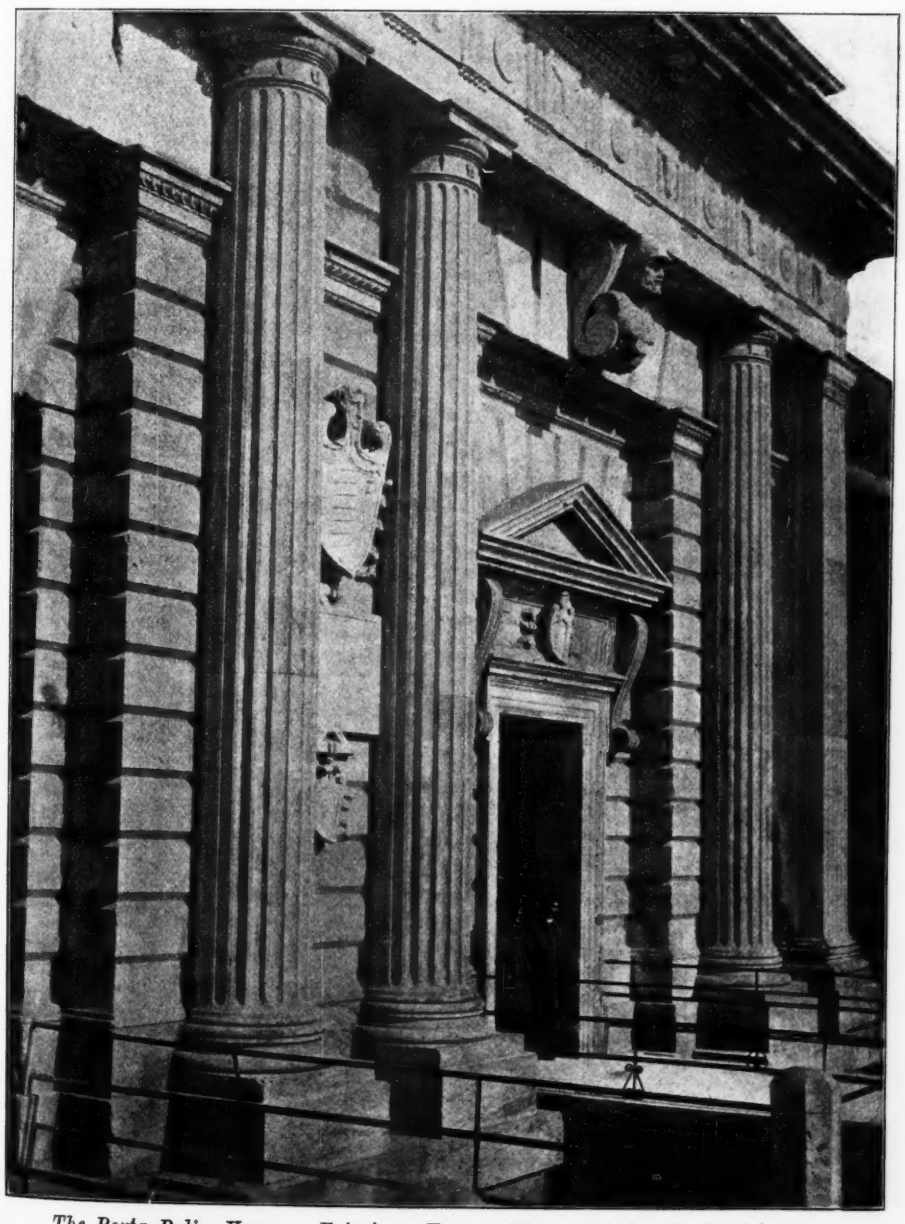
Erection of First Section of Hammersmith Car-shed.—The Highways Committee recommended, and it was agreed :—

"That expenditure on capital account not exceeding 6,725*l.*, and on maintenance account not exceeding 705*l.*, be sanctioned for the erection and equipment of the first section of the Hammersmith tramways car-shed, including incidental expenses.

That the first section of the Hammersmith car-shed be erected without the intervention of a contractor, and that the drawings, specification, etc., be referred to the Works Committee to execute the work on the schedule of prices, based on the bills of quantities prepared for the Poplar car-shed, which was submitted by the Works Committee for the erection of the first portion of the Bow car-shed, with a proportionate reduction in the amounts included for preliminaries and pumping, but with an increase of 5 per cent. on the prices generally.

That the track work, overhead equipment, etc., and the wiring and fitting for electric lighting, at the first section of the Hammersmith car-shed, be executed under the management of the Highways Committee by the direct employment of labour, in accordance with standing order No. B 167."

Roof-covers on Electric Cars.—It was agreed that expenditure on capital account not exceeding 2,300*l.* be sanctioned in respect of expenses connected with the construction and fixing of roof-covers on certain of the Council's electric tramcars; that an agreement be entered into with Messrs G. C. Milnes, Voss, & Co., and any other necessary parties, to provide for (1) the termination of the agreement between the Council and the company, entered into in pursuance of the resolution of December 20, 1904; (2) the settlement of the action brought by the company against the Council to recover royalties alleged to be due to the company in respect of the use of the "Magrini" patent for electric car roof-covers manufactured for or on behalf of the Council; and (3) the payment by the Council to the



The Porta Palio, Verona: Exterior. From a Photograph by Mr. Mauric Lyon.

company of a sum of 2,250*l.*, and the taxed costs of the action above referred to.

District Surveyors and Buildings on Routes of Improvements.—The Improvements Committee reported as follows :—

"Our attention has frequently been called by the Building Act Committee or by the Council's officers to favourable opportunities, owing to the rebuilding or extensive alterations of property, for effecting desirable improvements. There is no system, however, at present in force by which we can ensure receiving early notice of building operations along the line of suggested or authorised improvements, and cases have occurred where information has not reached us until it was too late to take any effective action. We think that, in order to remedy this defect, the District Surveyors should be asked to notify the Council of building operations in such cases. The Council has no power to require District Surveyors to give this information, and we therefore consider that the Council should sanction the payment of a fee of 10s. 6d. for each notification. We are advised that the cost for the current financial year will probably not exceed 50*l.* No provision for the expenditure was made in the annual maintenance votes, and it will therefore be necessary for the Council to approve a special maintenance estimate. The Building Act Committee concur in our proposals, and we recommend :—(*a*) That the special maintenance estimate of 50*l.*, submitted by the Finance Committee in respect of the payment of fees to District Surveyors for notifying the Council of building operations along the routes of authorised or suggested improvements, be approved. (*b*) That the payment to District Surveyors during the year ending March 31, 1908, of a fee of 10s. 6d. for each notification of building operations along the routes of authorised or suggested improvements be sanctioned."

The recommendations were agreed to.

Bridge Tramway Shelters.—Mr. Gautrey moved, and it was agreed :—

"That it be an instruction to the Highways Committee to consider and report as to the desirabiliy of erecting at the junctions of the Thames-embankment and Blackfriars and Westminster bridges tramway passengers' weather shelters similar to those to be found in most continental cities."

The Council adjourned at seven o'clock.

Fifty Years Ago.

FROM THE *Builder* OF NOVEMBER 21, 1857.

THE IMPROVEMENT OF THE CONDITION OF THE ENGLISH WORKMAN.

A CHANGE is coming over the management of our workshops and manufactories; the introduction of steam power, and the subdivision of labour, which has, in a great measure, been the result, have caused colossal establishments to rise up which are really wonderful to behold. Fifty years ago a manufactory which employed 100 men was an establishment worthy of notice; now we may travel over this land and see it thickly studded with works where from 1,000 to 2,000 hands are busily employed. Whether this concentration of human power will be eventually better for the working classes or otherwise is a question worthy of the most careful consideration, but which we will not now attempt to discuss. One thing, however, is certain, that some of these manufactories, including the men employed and their families, have a population of 3,000 or 4,000 enough living people to occupy a small town. Amongst such important bodies of the English people there should be provisions made of extent in proportion to the magnitude of the subject. If local government is found useful in towns, would not a system of management in these large communities be equally valuable?

We are induced to bring this matter before our readers in consequence of various conversations with both the managers and workmen of several large manufactories. In most cases the masters are most anxious to do all in their power for the benefit and improvement of the social position of the men, but there seems to be a fear on their part of being intrusive; the operatives are similarly sensitive, and so it is that little in comparison with what might be done is effected. It is a pleasant circumstance that in Lancashire and elsewhere the masters and the workpeople have, in some instances, acted together in that kindly and wise way which is to the advantage of all parties; but in the great majority of cases this has not been done, and there can be no doubt that many means of saving money, and also adding to the comfort of the employed, is lost by the want of agreement between the great body of the men and their employers.

*** It is satisfactory to reflect that in many cases this kind of agreement between employers and men, and the establishment of well-ordered residential villages for the workers, which was tentatively tried fifty years ago, has in recent years been carried out with entire success.—ED.

Illustrations.

THE LONDON SALVAGE CORPS' BUILDING, WATLING-STREET, E.C.

THE buildings of which we give an illustration were completed in the course of the present year. The site which they occupy is considerably larger than that covered by the earlier buildings of the Salvage Corps, which occupied about two-thirds of the site of the new buildings.

The ground floor is largely taken up with the stand-room in which the Salvage Corps traps stand ready for fire calls. The stables are behind the stand-room, and are so arranged that the two horses next on duty run to their positions directly the signal is given.

The men's dormitory is on the messanine, and has a sliding pole connecting it with the duty-room on the ground floor. The remainder of the ground floor is occupied by offices, and the basement is largely devoted to mess-rooms, recreation-rooms, etc., for the men. The chief officer has his office on the mezzanine, and his dwelling-house on the first floor.

The second floor contains, besides offices, the octagon meeting-room of the Salvage Corps and the Fire Offices Committee. This room is panelled in walnut, and has a ceiling of convex cove form. The four large windows are decorated with the badges of the fire companies represented on the committee.

The third floor contains the luncheon-room and further offices. The fourth floor houses the married men of the Salvage Corps, and the roof, which has a unique watch-tower commanding the whole of the City, is covered with an asphalt flat.

The frontage is in Portland stone. The general contractors were Messrs. Holloway Brothers, and the architect Mr. Paul Waterhouse, M.A. The works were under the superintendence of Mr. C. P. Draper, who

Headquarters of the London Salvage Corps, Watling-street. Plans.

unfortunately did not live to see the work completed.

ST. MARGARET'S CHURCH, EASTNEY.

THE portion of the church already completed is shown in the drawing exhibited in this year's Royal Academy, and consists of a chancel of three bays, 34 ft. long by 20 ft. wide, and 43 ft. high, with an ambulatory 5 ft. wide, screened on each side in the arches of the arcades, and continuing round the east end behind the altar. The chancel is lighted by a lancet window in each of the bays north and south. Beyond the ambulatory on the north are vestries, with the organ projecting into the chancel overhead, and on the south a chapel 28 ft. 6 in. long by 14 ft. wide and 20 ft. high. The reredos, 29 ft. high by 13 ft. 6 in. wide, is recessed for an altar 9 ft. long curved at the back over the retable and domed at the top over the subject of "The Majesty." The surround of the reredos, with its flanking piers for standard lights, is plated with sheets of brass riveted on the border, and blocks of the same having acanthus and scroll ornament in low relief. The retable is of white marble, with narrow vertical panels of pale green marble carrying a plain brass cross, the two altar lights being placed on the altar itself and the seven sanctuary lamps suspended from the roof in two horizontal tiers. The subject of "The Majesty" in the reredos is treated in tempera thus:—The figure of Christ is crowned, with the orb and sceptre, robed all in white, and seated on a throne of gold, beneath which arches the rainbow. The figure of Christ has the feet resting on the globe, and from out of this run downwards in winding course through a field or ground of vine ornament the four rivers of Paradise. At the four corners of the throne stand the emblems of the four Evangelists, forming in general outline behind the figure of Christ a large vesica of intense red. Somewhat lower than "The Majesty" sit, in two tiers, the four-and-twenty Elders, whilst above them is a group of minstrel angels, their wings reaching into the domed top of the reredos. At the very apex of the dome is "The Dove," with rays descending therefrom. The altar is to be of the same material as the reredos, but lacquered in silver grey. The altar-rails are in oak, with the emblems of the Evangelists repoussed in metal. The lectern is in brass, with the following emblems on the four cardinal sides, namely, the Pelican with the nails and scourge, the Dove with the lily and the lamp, the Fish with the anchor and ship, and the Lion with the crown and palm. The nave, 85 ft. long by 35 ft. wide, and 43 ft. high, is subdivided into five bays by stone arches springing from the floor across the nave. The roof, following the curve of these cross-arches, is divided into eighteen panels in each bay, the lower three panels throughout being filled with winged and vested figures of the hierachy of Heaven, the first bay of the roof being shown over the chancel arch in the view of the interior, with an important cross in metal suspended beneath. The clearstory consists of seven lights in each bay, the three centre lights being glazed and surrounded by an arch also springing from the nave floor, with subsidiary arches beneath opening into the aisles, the latter being lighted by lancet windows in each bay. Beneath the clearstory is a frieze with verses in Latin from the Te Deum. At the west end is a baptistry in the centre, connected by a lobby on each side with the north and south porches at the ends of the aisles. Two bays of the nave are now being built over the temporary church, with two bays of the nave aisles on each side. The portion of the temporary church beneath the permanent nave will be removed as each new section of the church is built. The church externally is built of red brick with stone dressings, and plastered internally also with stone dressings. The incumbent is the Rev. W. A. King King, the church being built by Mr. Henry Jones, of Southsea, from the designs of Mr. John T. Lee, architect, of Great James-street, Bedford-row. There will be accommodation for 800 adults when the church is completed.

MAUSOLEUM TO THE LATE PROFESSOR BANISTER FLETCHER, F.R.I.B.A.

THE monument has been erected at Hampstead Cemetery over the family vault, and is situated at the junction of four roads. It consists of the bronze bust of the late Professor by Mr. Nesfield Forsyth, which was exhibited at the Royal Academy, on a stone pedestal of Grecian Ionic design, and surmounted with a capital charged with the family arms and legend, the whole worked in a wreath of laurels. The podium rests upon three steps, and is designed to receive further inscriptions. Four monolithic columns surround the bust, having carved Ionic bases and capitals, the laurel being again used as a decorative ornament in these. The entablature and roof is richly moulded and carved, and is crowned with a sculptured vase. At the base, as supporters, are seated two life-size figures of Faith and Fortitude.

The whole of the work is executed in specially-selected hard brown Portland stone from the Wakeham quarries, and has been carried out from the design and detail drawings of the architects.

NATIONAL PRIZE DESIGNS.

THE designs given this week, forming Nos. 5 and 6 of the short series of National Prize Designs which we are publishing, are both for stencilled hangings.

No. 6 by Miss Derrett, is the more appropriate of the two for textiles, in which rigidity of line should be avoided. No. 5, by Miss Heron, is a very pleasing design in itself, but its character is more suitable for a wall-paper than for a textile hanging.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

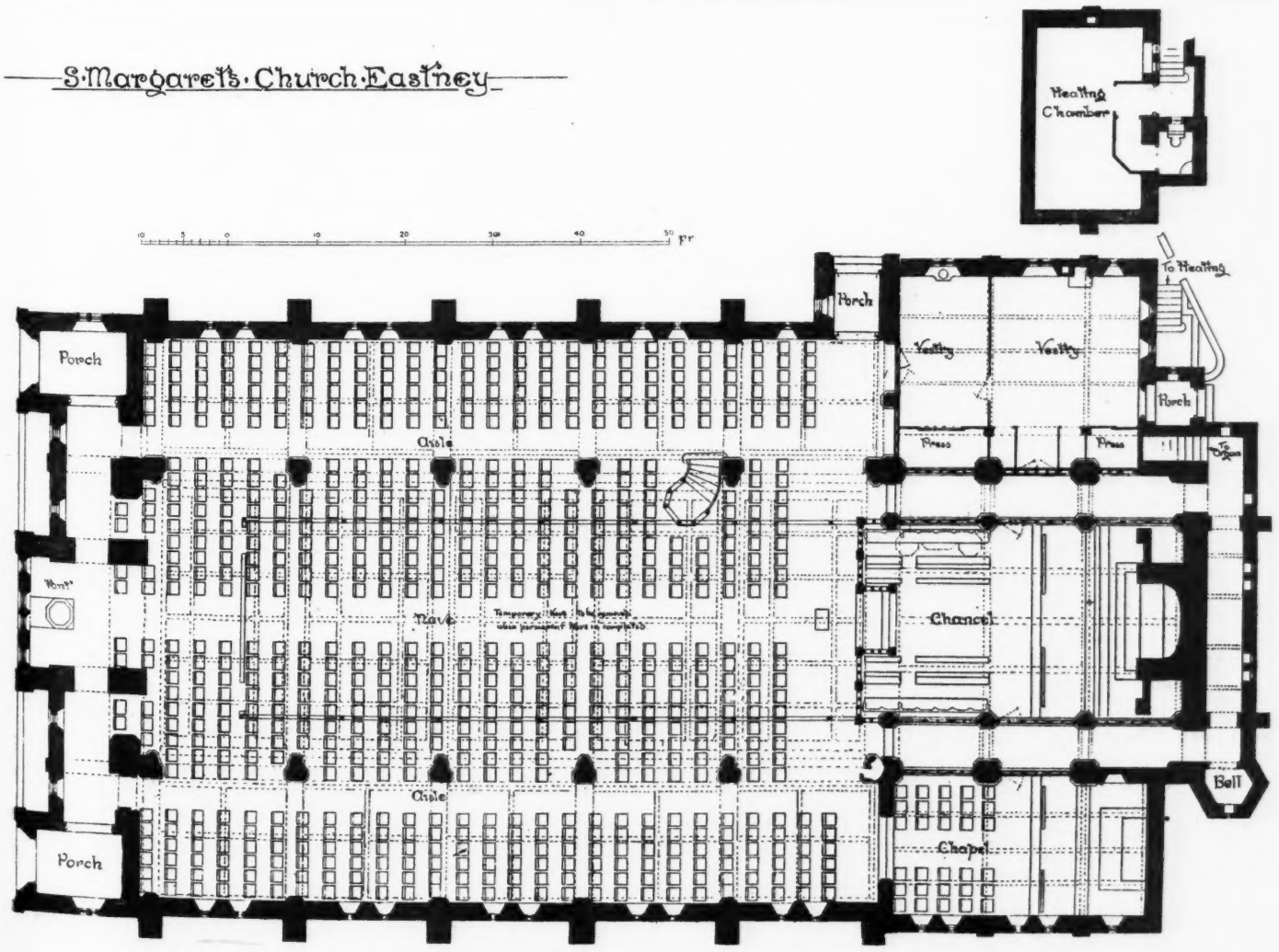
Lines of Frontage and Projections.

St. George, Hanover-square.—Erection of a projecting shop cornice at No. 227, Regent-street, St. George, Hanover-square (Mr. J. Glover).—Consent.

Fulham.—The retention of six projecting balconies in front of St. Margaret's-mansions, Lillie-road, Fulham (Mr. F. C. Spiller for Mr. A. F. Brown).—Consent.

Hackney, South.—That the application of Mr. G. H. Lovegrove, for an extension of the periods within which the erection of buildings on the south-eastern side of Cassland-road,

S. Margaret's Church Eastney



Victoria-park, Hackney, westward of Brookfield-road, was required to be commenced and completed, be granted.—Consent.

Hammersmith.—That the Council, on the application of Messrs. Caslake & Co., do consent to the retention of a projecting sign at the Art Metal Works, Scrubs-lane, Willesden.—Consent.

Holborn.—Retention of a projecting shelter in front of the Kingsway Theatre, Great Queen-street, Holborn (Mr. F. W. Foster for Miss Lena Ashwell).—Consent.

Kensington, North.—Porches in front of Nos. 119, 121, and 123, High Lever-road, Kensington (Messrs. Trant, Brown, & Humphreys).—Consent.

Kensington, South.—The construction and retention of two external steel and concrete gangways to connect two blocks of Messrs. Ponting's premises, Kensington High-street, Kensington (J. Barker & Co., Ltd.).—Consent.

St. George, Hanover-square.—A deviation from the plan approved for the erection of an iron and glass shelter in front of the Wilton Hotel, No. 32, Wilton-road, St. George, Hanover-square, so far as relates to an alteration in the construction (Messrs. J. A. J. Woodward & Sons).—Consent.

St. Pancras, West.—Piers and an archway at the entrance to Granby House, Harrington-street and Granby-street, St. Pancras (Messrs. Harvey & Potter for Edwards Creameries, Ltd.).—Consent.

Wandsworth.—The construction and erection of bay-windows and porches in front of houses on the northern and southern sides of Eatonville-road, Wandsworth (Mr. W. C. Poole for Mr. F. Eaton).—Consent.

Width of Way.

Wandsworth.—An addition at the rear of No. 292, Streatham High-road, Wandsworth, at less than the prescribed distance from the centre of a footpath on the southern side of Streatham Green (Messrs. Treacher & Son for Mr. C. Crowther).—Consent.

Woolwich.—The retention of a building at the rear of No. 20, Kingsman-street, Woolwich, with a boundary fence at less than the prescribed distance from the centre of the passageway leading out of Warwick-street (Mr. H. E. Thomas for the West Kent Co-operative Dwellings Company, Ltd.).—Consent.

Battersea.—Buildings on the northern side of Lavender-hill, Battersea (Messrs. A. W. Taylor & Co.).—Refusal.

Woolwich.—A building on the western side of Charlotte-street, Woolwich, northward of No. 2 (Mr. J. E. Edwards for Mr. H. Hart).—Refused.

Width of Way and Line of Frontage.

Hammersmith.—The retention of a cloak-room and lobby addition at St. Peter's Girls' School, Hammersmith, abutting upon St. Peter's-grove (Mr. Castello).—Consent.

Projection and Construction.

St. Pancras, South.—The erection of a projecting crane in front of Nos. 73 and 75, Kenton-street, St. Pancras (Mr. F. Selby for Messrs. C. Jacques & Sons).—Consent.

Deviation from Certified Plans.

Bermondsey.—Deviations from the plan certified by the District Surveyor under sect. 43 of the Act, so far as relates to the proposed erection of a building upon the site of "The Waterman's Arms" public-house, No. 26, Dockhead, Bermondsey (Mr. W. Stewart for Mann, Crossman, & Paulin, Ltd).—Consent.

Formation of Streets.

Lewisham.—That an order be issued to Mr. J. D. Young, refusing to sanction the formation or laying out of a street for carriage traffic to lead from Sparta-street to Lethbridge-road, Lewisham (Mr. A. C. Weddell).—Refusal.

Uniting of Buildings.

St. Pancras, West.—That the Council do make no order with regard to the application of Mather & Platt, Ltd., for permission to form party wall openings exceeding by 18 in. the width allowed by sect. 77 of the Act, at factory premises abutting upon Arlington-road, Miller-street, and Carlow-street, St. Pancras, and for permission to use armoured doors in lieu of iron doors.—No order.

AWARDS AT THE LETCHWORTH HOUSES EXHIBITION, 1907.

THE following is the list of awards at the Letchworth Urban Cottages and Small Holdings Exhibition held this year:—

URBAN COTTAGES SECTION.

Class I.

First prize, 30*l.* and medal. Catalogue numbers, 215 and 216. Exhibitor, Miss A. J. Lawrence, Cloisters Lodge, Letchworth. Architect, C. M. Crickmer, 1, Lincoln's Inn-fields, W.C.

Class II.

First prize, 30*l.* and medal. Catalogue numbers, 211 and 212. Exhibitor, Miss A. J. Lawrence, as above. Architect, C. M. Crickmer, as above.

Class III.

First prize, 30*l.* and medal. Catalogue numbers, 235 and 236. Exhibitor, G. Christie-Miller, Bosden House, Offerton, Stockport. Architect, C. M. Crickmer, as above.

Second prize, 20*l.* and medal. Catalogue numbers, 251 and 253. Exhibitor, A. F. Houfton, Leeming-street, Mansfield. Architect, P. B. Houfton, Chesterfield.

Third prize, 5*l.* and medal. Catalogue numbers, 223 and 224. Exhibitors, Misses E. C. & D. Cruikshank, Queen's-gardens, Hyde Park, W. Architect, O. P. Milne, 16, Great James-street, Bedford-row, W.C. (late 77, Chancery-lane, W.C.).

Class IV.

First prize, 30*l.* and medal. Catalogue numbers, 219 and 220. Exhibitor, R. T. Heys, Dorset House, Heaton Chapel, near Stockport. Architects, Bennett & Bidwell, Letchworth.

SMALL HOLDINGS SECTION.

Class V.

No entries.

Class VI. (Buildings only).

First prize, 15*l.* and medal. Catalogue number, 275. Exhibitor, F. Pearson, Main-avenue, Letchworth. Architect, A. O. Cave, 29, John-street, Bedford-row, W.C.

Class VI.

No award for cottage in this class.

Class VII. (House only).

First prize, 20*l.* and medal. Catalogue number, 271. Exhibitor and architect, A. H. Clough, Burley, Ringwood, Hants.

Class VII. (Buildings only).

First prize, 15*l.* and medal. Catalogue number, 270. Exhibitors and Architects, South Lincolnshire Small Holdings Association.

Second prize, 20*l.* and medals, equally divided between:—Catalogue numbers, 272 and 273. Exhibitors, W. Jackson, East View, Baldock-road, Letchworth; F. Chapman, Lannock View, Letchworth. Architects, Picton & Hope, Letchworth.

The jurors in the Urban Cottages section were Messrs. E. Guy Dawber, F.R.I.B.A., George Nicholls, J. S. Pickering, M.Inst.C.E., Arthur Vernon, and J. J. F. Sykes. Those in the Small Holdings section were Messrs. J. C. McCowan, Richard Jebb, and J. F. J. Sykes.

Architectural Societies.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—The annual meeting of the Leeds and Yorkshire Architectural Society was held on the 14th inst. at the Queen's Hotel, Leeds. Prizes were handed to the following winners:—Measured drawing—Mr. F. Scatchard (silver medal and 5*l.* 5s.), Mr. J. T. Pilling (bronze medal); design—Mr. J. Greaves (3*l.* 3s.), Mr. J. H. Farrar (1*l.* 1s.); sketching—Mr. G. H. Foggitt and Mr. J. Greaves (prize divided, 2*l.* 2s. each); construction—Mr. H. Carnelley (3*l.* 3s.); essay—Mr. J. Greaves (2*l.* 2s.); sketching club—Mr. R. A. Easdale (5*l.* 5s.), Mr. W. P. Rylatt (3*l.* 3s.).—The President (Mr. H. S. Chorley) then proceeded with his annual address, in the course of which he said this was the thirty-second annual meeting of the Society, which had had a very successful career. They needed all the help they could give one another. They were surrounded by many and great dangers; their responsibilies were great, and extended in many directions. All people were influenced greatly by their surroundings, and if the environment was sordid and devoid of beauty, depravity and a low moral condition would usually be found among the people. On the other hand, beauty was usually accompanied by refinement, a high state of civilisation, and, as a rule, a high moral condition. Architecture, like dress, tended to become more cosmopolitan and less national. He was doubtful how far that was to be welcomed. Half the charm of architecture, at any rate from an archæological point of view, lay in the varying ways in which it was developed in different countries, taking upon itself the distinctive character of a people and often bearing in itself the record of a historical past. Such interest must very largely be a thing of the past, and architectural design would tend to a world-wide similarity. He believed that there was much originality to-day, but any original idea was quickly spread until it was shared in many countries. Local individuality could be maintained to a much larger extent than at present if more attention were paid to the natural building materials which a locality provided. This was a matter which architects should seriously consider. It was a pity that the old Yorkshire stone slating should be replaced by imported tiles, and that the old Yorkshire flag floors should be replaced by concrete. Careful consideration should also be given to the relation of a site to the building to be raised on it. Mr. Chorley went on to refer to architectural competitions, and especially to the regrettable incident connected with the competition for the Acton Municipal Buildings. He also spoke of the various branches of work of the Society, especially mentioning the Sketching Club and the library. The School of Architecture in connexion with the Leeds Education Authority was now an accomplished fact, and the classes should be of the greatest assistance to architectural students within the district. There could be no doubt that the scope of an architect's work was being increased year by year and becoming more complex, so that the training which was sufficient for their fathers would not suffice for to-day. The tendency of modern work was towards the greater elaboration of working drawings. Their profession must be progressive, but, unlike other professional men, the architect must look back. He must be to some extent an archæologist, at any rate in the sense that he should fully study the works of those who had gone before him. He hoped the students would not only avail themselves of the excellent classes in Leeds, but would also travel and sketch as much as possible. In conclusion, he said that they might congratulate themselves that the Society had had on the whole an active and successful year. For themselves as individuals they must hope for continued prosperity in the future, recognising that, though few of them could be great in their profession, they could all do their best, and any good and honest work was a step in the right direction.—On the motion of Mr. Percy Robinson, seconded by Mr. Edwards, of Bradford, the President was heartily thanked for his address, and a vote of thanks was also accorded to Mr. A. E. Kirk, the Hon. Secretary. A smoking concert followed.

THE ROYAL SANITARY INSTITUTE:

THE SMOKE PROBLEM IN LARGE TOWNS.

A SESSIONAL meeting of the Royal Sanitary Institute was held on Thursday evening last week, at the Parkes Museum, Margaret-street, W., Sir William B. Richmond, K.C.B., R.A., presiding, when a discussion took place on "The Smoke Problem in Large Towns."

Dr. Louis C. Parkes, D.P.H., who opened the discussion, said that in the metropolitan area the prevention of smoke was provided for in the Public Health (London) Act, 1891, sects. 23 and 24. It was the duty of the metropolitan sanitary authorities (the city and borough councils) to enforce the provisions of those sections, and no information could be laid for the recovery of any fine under sect. 23 except under the direction of a sanitary authority. This did not, however, apply to sect. 24, which defined as nuisances (*a*) any furnace which did not, as far as practicable, consume the smoke arising from the combustible used therein, and which was used in any manufacturing or trade process; and (*b*) any chimney (not being the chimney of a private dwelling house) sending forth black smoke in such quantity as to be a nuisance. These were nuisances liable to be dealt with summarily under the Act, to which the provisions of the Act relating to nuisances (sects. 2 to 15) applied; and under sect. 12 a private individual could complain to a justice of any such nuisance, and could initiate proceedings as if he were a sanitary authority. For practical purposes, sect. 23 of the Act, and subsect. *a* of sect. 24, were dead letters in London owing to the contained provisoes, which rendered nugatory any proceedings against the owners of furnaces which did not consume the smoke arising therefrom, if it was proved to the satisfaction of the court that such furnaces were constructed to consume, as far as posible, or as far as practicable, all the smoke arising therefrom, and that such furnaces had been carefully attended to, and had, in fact, consumed, as far as possible, the smoke arising from them. In any proceedings, then, under sect. 23, or under sect. 24*a*, the defendant was entitled to offer evidence as to the nature and use of the furnace or furnaces complained of, and it was quite apparent how difficult it became for the complainant to offer rebutting

evidence on those points which would override the evidence of the maker or user.

The Private Dwelling-house.

They might then concentrate their attention upon sect. 24, subsect. *b*. First, it was apparent that no action could be taken against the chimney of a private dwelling-house which sent forth black smoke in such quantity as to be a nuisance. Now, apart from the question of what constituted a private dwelling-house, about which doubt sometimes arose, there was really no reason in law, equity, or common sense, why the private individual who lives in a dwelling-house should be allowed to perpetrate that for which the trader or manufacturer was penalised. In these days, when well-designed (not to say smokeless) grates, fireplaces and furnaces were to be obtained at no great cost, the owners or occupiers of private dwelling-houses, should be held responsible for occurrences which were easily preventable with a little care or forethought. It might be said that the chimneys of private dwelling-houses, taken individually, were not the worst offenders in the matter of smoke; and this was no doubt generally correct. But there were many large houses in the West-end of London where the kitchen chimney at certain hours of the day, or the furnace for the hot water and heating apparatus, with which many mansions were now fitted, sent out dense volumes of black smoke, to the annoyance of immediate neighbours, and to the agravation of the smokiness of the general atmosphere. Then there was also the case of the householder whose kitchen chimney was left unswept and neglected until it caught fire. The nuisance in the event of this happening was a very serious one to the neighbours; and the effluvia arising from the partially-consumed soot and dirt in the chimney were very nauseating and penetrating. Any amendment or re-casting of the smoke provisions of the Act, the chimney of the private dwelling-house should no longer be exempted from the operation of the law.

"Black" Smoke.

The next point was as to whether the word "black," which qualified the nature of the smoke, ought to be retained. He could see no good and sufficient reason for its retention. Yellow smoke or brown smoke might be just as much a nuisance as black smoke. It was not a question of colour, but of volume, density, and contained carbon and hydro-carbon particles. In practice also the retention of the word "black," under modern conditions, was likely to lead to injustice. The baker, from whose single small furnace and 9-in. chimney black smoke escaped for five or ten minutes, would be liable to a fine, whilst the manufacturer with his 3-ft. chimney, or the electrical generating-station with its multiple large furnaces and 10-ft. chimney, would escape prosecution, because the gases and smoke escaping into the atmosphere from the latter, although enormously greater in volume than the baker's contribution, were not sufficiently concentrated at the chimney-tops to have a black appearance. Surely the proof of the smoke being a nuisance should be sufficient.

Special Privileges under Statutory Powers.

In legal proceedings against the ordinary offender for a smoke nuisance under sect. 24, subsect. *b*, if the nuisance was proved, a conviction must follow, and the defendant was not entitled to urge in excuse that his furnaces were properly constructed, and used with all reasonable care and diligence. Such evidence was irrelevant, and could be excluded. In the case, however, of a railway or other company working under statutory powers, by and with the consent of Parliament, it had been held in the Divisional Court in the case of the Hammersmith Borough Council *v.* the Central London Railway (June 6, 1901), that it was sufficient answer to a complaint, under sect. 24, subsect. *b*, if the company could show that it was carrying on the duties entrusted to it by Parliament in the best possible practicable manner. This decision, of course, placed the onus on the complainant to prove, by rebutting evidence, that the works were not carried on in the best possible practicable manner, either by reason of imperfect original construction, defective methods of working, or the use of improper fuel. It was very doubtful, indeed, if the original construction of the furnaces could be called in question in a summons under sect. 24, subsect. *b*. This appeared to be a matter that could only be dealt with by proceedings for an injunction in the High Court. In such cases, sect. 24, subsect. *b*, was deprived of its special virtue, and was placed on no better footing than sects. 23 and 24, subsect. *a*, which had been found to be unworkable, and had in consequence become dead letters. It was very doubtful if Parliament contemplated, in the grant of statutory powers to companies, that such undertakings should be expressly excluded from the operation of general Acts of Parliament dealing with public health. It may be said that those who were likely to be affected by the operations of an undertaking seeking statutory powers could appear before the Parliamentary Committee which considered the Bill, after giving formal notice of opposition, and ask for the insertion of a clause in the Bill safeguarding any threatened rights or interests. But the answer to this was that even local sanitary authorities were not always sufficiently foreseeing to divine the exact methods by which such undertakings might injuriously affect the localities over which they exercise a municipal control, and it was only exceptionally that private individuals could protect themselves by such means. It would, therefore, seem to be desirable in any future amendment of the Public Health Acts that a proviso should be inserted which would make it clear that undertakings which were authorised by Parliament were not in any way excluded from the operation of the general provisions of the statute.

Proposed Amendment of the Law.

To sum up, then: an amendment of the law was required, (1) by the abolition of the words exempting the chimneys of private dwelling-houses from the operation of the law, in order that private offenders might be dealt with on the same basis as the traders and manufacturers; (2) by the abolition of the word "black," which defined the nature of the smoke, but the use of which was quite uncalled for and unscientific, having regard to the modern conditions prevailing in the construction and use of furnaces for raising steam; and (3) by abolition of the special privilege supposed to be conferred on undertakings working under statutory powers, which rendered them more or less unassailable by the existing smoke provisions of the Act. An alteration of the law on the lines suggested would enable sanitary authorities to take steps of a wider and more general nature for the suppression of the smoke trouble than had hitherto characterised their action, and, by bringing—especially before the private individual or householder—the fear of the law, would tend to hasten the existing movement in favour of gas for heating and cooking, of smokeless coal (whether natural or artificial) for use in fireplaces or furnaces, and of steam, hot water, and electric plants for the same purposes.

The Coal Smoke Abatement Society.

Mr. H. A. Des Vœux, M.D., representing the Coal Smoke Abatement Society, said that when his Society came into existence they found practically barren soil to work upon. Their stated policy was: (*a*) to aid in enforcing to its utmost the existing law dealing with the smoke nuisance, which was contained in the Public Health Act, 1891; (*b*) where the present law was inefficient to bring about an amendment; (*c*) to inquire into the present causes of the smoke nuisance and the best means of removing or lessening the same, and to promote the investigation of appliances designed with that object; (*d*) to obtain evidence of the methods of dealing with smoke at home and abroad; (*e*) to promote the knowledge of methods by which the emission of smoke might be prevented, and for that purpose to encourage the organisation of exhibitions and to stimulate invention by the offer of prizes. And to this they had adhered.

There had always been debate as to which created the most nuisance; the smoke from the factory, or that from the domestic chimney. It was needless to argue the point; an enormous amount of harm was done in London from the unburnt part of the 15 millions of tons of coal, whether used in one or the other. But, fortunately for the cause, an Act of Parliament existed dealing with the former. It was and is a clumsily-worded piece of legislation. The difficulty had always turned upon the construction of the word "black," and the implied meaning of the section was that no smoke was actionable and none a nuisance which was not black. But the latter contention was ridiculous, as we are all aware that no smoke-fog (or smog, as he liked to call it) was black, but was a yellowy-brown colour.

Companies and Statutory Powers.

Certain companies received from Parliament statutory powers, and those of them which were electric power or light companies worked under a general Act entitled the Electric Lighting (Clauses) Act, 1899. Sect. 81 of this Act provided: "Nothing in the special order shall exonerate the undertakers from any indictment, action, or other proceedings for nuisance being caused or permitted by them." Would they believe it that a Bill called the South Metropolitan Electric Power Supply Bill received the sanction of Parliament last year, although sect. 4 of the Bill enacted that the company and its works should not be subject to this clause? He earnestly hoped that those in his audience who were on borough councils would direct the attention of their councils to this ruse, for he was informed that it was being repeated in Bills for the ensuing session of Parliament.

Remedies for the Emission of Smoke from Factories.

To turn now to the remedies for the emission of smoke from factories; as he was not an engineer, it would be more profitable to refer to the report tabulated by Dr. Rideal from the answers given to a circular letter issued by the Smoke Abatement Society to sixty-three firms, in connexion with whose chimneys no smoke nuisance had been recorded for six months, although they had all previously been reported on, and many prosecuted. Of the thirty-eight firms who replied, three had substituted gas-engines for steam boilers, leaving thirty-five who still used coal. Of these, seventeen burnt Welsh coal only, one burnt Welsh coal and coke, two burnt Welsh coal and hard steam coal, one burnt Welsh coal and bituminous nuts, one burnt Welsh coal and anthracite, four burnt anthracite only, one burnt anthracite and hard steam coal, one burnt anthracite coke breeze and small house coal, one burnt hard steam coal only, one burnt good small coal, one burnt bituminous coal, one burnt coke. Eighteen firms used fifteen different kinds of appliances and stokers. There was considerable difference of opinion as to the value to be placed on mechanical contrivances, but there was none as to the value of stoking. In one particular this report was very valuable. Only in two cases did the manufacturers or users state that the abatement of smoke was expensive as compared with their former methods. The result in percentages was this: under 6 per cent. stated there was increased expenditure, while 94 per cent. stated that the new methods were economical; or, in other words, money was saved. This was the most hopeful news they had so far received. Apart from these special inquiries, they had had information from firms who stated that they had saved, in some cases hundreds of pounds, in others thousands of pounds per annum.

Smoke from Private Houses.

In spite of the numerous tests carried out by the Society in conjunction with, and with the kind co-operation of, H.M. Office of Works, they had been unable to discover any grate which consumed all the smoke from a fire of bituminous coal. There was a vast difference between a good grate and a bad grate, a difference in the amount of emission of smoke of 50 per cent. at least; and for those who would not do without a fire of bituminous coal, let there be some public authority who should decide which grate might be used and which not. Every grate for the purpose should be tested, as every motor-omnibus was now tested. The only hope for the cities of England was a smokeless fuel, either alone or combined, with a hot water, hot air, or steam system.

It was contrary to the—should he call it genius?—of the British to like a hot-water system throughout a house such as was used so much on the Continent and in America under the name of "chauffage centrale." The objections to it were many and very striking; it was a dry heat, a stifling feeling, and it did not ventilate a room. With a chauffage centrale there must be some system of ventilation apart from the chimney, and as practically in England no such system existed, the house where it was installed would have to be largely reconstructed. But even in houses as they were, a central system might be more often employed with advantage. A radiator in the hall and others in the passages would give a large amount of heat which would be readily diffused throughout the house, and would therefore save the lighting of nearly all fires on days which were only chilly, not cold, and some of the fires on very cold days.

Smokeless Fuels.

But it was chiefly in the further employment of smokeless fuels that the hope of domestic improvement lay. Fortunately, there were several to choose from: gas, electricity, anthracite coal, coalite, and one or more imitations of the latter. The Coal Smoke Abatement Society had officially tested and reported on coalite, and he hoped that ere long that report would be printed and published. For himself he was favourably impressed with it. He burnt it last year in his own house, and it was easily lighted, burnt up rapidly and brightly, and when at its best gave a more delightful fire than the best household coal. It was very hot, and had no harmful effect on the atmosphere of the room. The great drawback to it was that, being only about half the weight of coal, bulk for bulk, a greater number of scuttles of it had to be carried to the fire, causing an extra amount of leg labour.

Anthracite coal was so far useless for ordinary grates, as the difficulty in lighting it was immense; and although it had been years on the market, it had not come into favour. But in spite of that it had many points in its favour. Gas was now by far the most commonly used of smokeless fuels. It had many and great advantages: always at hand, only a match to strike to create a fire which gave out a good heat in five minutes, no dirt and no labour; it was unquestionably an enormous advance on open-fire heating. It had most of the points of a good open fire without its dirt and without the labour connected with it. Its reputed drawbacks were that it was dangerous in use, and had the power of drying the atmosphere. Of course, it was dangerous in use if the grate was carelessly set, so that the products of combustion could escape into the room, or if it was so made that the gas itself, instead of being burnt, found its way into the atmosphere. But these were accidents of ignorance or neglect, and need not occur; and probably arose in the past because the grates were fitted by those who did not understand the simple laws of combustion, and were inspected by officials from the gas companies who were, neither by education or ability, fitted for the purpose. There had been an increase in the ten years 1895-1904, in London and suburbs, of 700,000 gas fires and cookers. Surely this was a sufficient commentary on the dangers of these fires. With regard to the drying of the atmosphere by gas fires, he had long been of opinion that gas fires only dried the atmosphere comparatively and in proportion to the heat produced. The so-called drying effect was only produced when enough fresh air was not admitted into the room; and that if such a sensation was produced, all that was necessary was to open an inch or two of window and all would be changed. Gas fires did not produce the cold draught along the floor, such as was felt with coal fires, this being due to the fact that less air passed up the chimney with a gas fire than with a coal fire, and consequently the ventilating power of a gas fire was not so good as that of a coal fire. But the ventilation of a coal fire was often so great that in cold weather windows and doors were kept tightly shut to prevent the draught; whereas in the coldest weather, with a gas fire, a little open window was both bearable and comfortable. As to electricity, personally, he had had no experience of it. The fires had no ventilating power. They consumed no air, they made no fumes; but they did not help to get rid of the products of the combustion of human bodies. The public believed that they are the last word of sanitary science, but if they were used some artificial means of ventilation must be found.

He had always maintained that in private houses it was the kitchen chimney which emitted the most smoke, and, furthermore, that this was fortunate, as there existed in that case less opposition to the introduction of change. Gas cooking was employed most extensively, and, as far as he could learn, cooks were now converted. The objection to gas cooking lay not with them, but with the difficulty in connexion with supplying hot water continuously throughout the house. This could easily be overcome by a coke boiler which, at a very small annual cost would give sufficient hot water, not only for baths and ordinary use, but for heating a radiator or two in the passages. What was now required was a permanent exhibition of smoke abatement appliances, and he was in hopes that ere long such an exhibition might be in existence.

A general discussion followed, in which the Chairman, Dr. Rideal, and others took part.

Competition.

GIRLS' SCHOOL, ROTHERHAM.—The competitive designs for the erection of a municipal secondary school for girls in Rotherham will be exhibited in the Assembly Room, Town Hall, Rotherham, on Monday next, the 25th inst., between the hours of 10 a.m. and 4 p.m., for the inspection of architects.

BOOKS RECEIVED.

PRINCIPLES OF REINFORCED CONCRETE CONSTRUCTION. By F. E. Turneaure and E. R. Maurier. (Chapman & Hall.)

IN ENGLISH HOMES: Photographs by Charles Latham; text by H. Avray Tipping. (George Newnes, Ltd. 2*l.* 2s.)

THE CHEMISTRY OF GAS MANUFACTURE. By Harold M. Royle, F.C.S. (Crosby Lockwood & Son.)

SCAFFOLDING: A TREATISE ON THE DESIGN AND ERECTION OF SCAFFOLDS, GANTRIES, AND STAGINGS. By A. G. H. Thatcher, Building Surveyor. Second edition, revised. (B. T. Batsford. 5s.)

EXAMPLES OF CLASSIC ORNAMENT FROM GREECE AND ROME. Drawn from the originals by Lewis Vulliamy. (B. T. Batsford.)

Trade Catalogues.

MESSRS. COOPER, WETTERN, & Co. send us a pamphlet describing one of the "Grey Royal" granite quarries at Liholt, on the shore of the Idefjord, between Norway and Sweden. This variety of granite, which some of our readers may remember to have seen at the last Building Trades Exhibition, has a very fine and even texture, and is characterised by pleasing and uniform colour. It is said to possess the following properties:—Specific gravity 2·67, weight 163·12 lb. per cubic foot, and crushing strength 1,800 tons per cubic foot. As some of the seams in the quarries are from 8 ft. to 10 ft. thick, blocks of stone weighing from 10 to 15 tons can be quarried without difficulty, and loaded on steamers from the deep-water quay on the shore of the fjord.

A series of sheets accompanying the pamphlet gives sections and perspective views of ashlar blocks with various types of dressing, drawings of finished blocks for steps and wall copings, and two photographic views of portals erected in London to the designs of Mr. H. Percy Adams and Mr. J. S. Gibson.

The "Draught, Dust, and Weather Excluder Company" (Hereford) send us a small booklet giving particulars and full illustrations of their excellent device called the "Durabar," for stopping up spaces under doors by a contrivance which only acts when the door is closed, leaving it when opened free to pass over a thick carpet or drugget without obstruction. It has already been mentioned favourably in our columns.

Correspondence.

ROKER CHURCH.

SIR,—It has been pointed out to us that the account of this church given in your issue of October 12 did not explain the use of the roof arches and concrete construction.

The use of the roof arches was founded on an experiment made by me many years ago in the building of a church in Dorset. In an exposed situation, subject to heavy gales, the ordinary construction of a church roof with framed wood principals is not a useful one. The trusses vibrate under the weight of the wind, and, as was found in an instance close at hand, the creaking and straining of the timbers may make noise enough to seriously interrupt the church services. To avoid this discomfort stone arches were used in place of wood principals, and quite successfully for the purpose. It was found, moreover, that on a site where stone could be got close at hand the expense of the arches was, under a builder's estimate, less than that of wood framed trusses. Certain authorities had, however, objected on the ground that these arches were not safe, and, in order to satisfy them, the diagram of weights and thrusts was prepared, a summary of which is here given. I may add that an examination of the building made last year showed that there had been no movement or spread of the arches, which had then been built about twenty years.

The left side of the diagram gives the arch under the average normal conditions, the investigation being made for each joint of stonework laid dry as shown; the coarsely-dotted line is that of the calculated thrusts. Since the arch and abutments have been designed to place this line in the middle of each stone, there is, theoretically, no weakest point, or tendency to deformation. A is, however, the joint where frictional stability is least, and B that where the crushing pressure per square inch is greatest.

On the right side of the diagram the same arch and abutment are exhibited under extreme conditions. (1) A hurricane being supposed to bear on the opposite side of the roof, and largely increase the load; the coarsely-dotted line on the right is that of the thrust at each joint. Under these conditions A is again the joint of least frictional stability, B that of greatest crushing pressure per square inch; while C and C^1 are the joints of least positional stability. At C the arch stones would have the greatest tendency to turn outwards; at C^1 to fall inwards.

(2) Under the opposite condition—viz., if the roof-load were removed, as might happen from fire, or in the course of repairs—the thrust line is shown finely dotted. D is now the joint where the voussoirs might open outwards, and D^1 the joint at which they would bend inwards.

From this investigation it appeared: (1) that the arch of the form drawn was inclined to lift its crown unless weighted; (2) that only under excessive weight was the abutment called into play, so that beyond the dotted oblongs the abutments were superfluous; (3) that the oblong of masonry Q might also be regarded as a superfluous filling beneath the corbels from which the arches sprang.

On the basis of this experiment the roof arches of Roker Church were drawn by me. The site of the church here, too, was on a hilltop exposed to the sea; stone was at hand, but in this case more suited for big concrete construction than for an arch of dressed voussoirs. Dressed stone was, indeed, an expensive luxury in the neighbourhood; but arches of rough big concrete would be economical.

Roker Church, however, had to be designed to seat some 700 in its nave, instead of the 200 seatings of the Dorset church. Now, the aisles in mediæval parish churches were just the makeshifts of addition—in modern parish churches the pillars of aisle-arcades are inconvenient. These considerations seemed to justify the attempt to repeat the Dorset experiment upon a larger scale, with arch spans of 42 ft. and a floor width of 52 ft., obtained by getting passages in the thickness of the walls. The weaker points of the former construction were noted and the joints of least stability reinforced: (1) by stanchions enclosed in the mass of the

wall; (2) by the arch and its load being bound together into one solid compactment. It had been intended to use a tough marble for the shafts, etc., under the springing corbels, but from motives of economy this was given up. The stones of the shafts show no weakness, but some of the lintels cracked in the course of building. They were reinforced, and no movement has since taken place.

This construction was designed and carried out by Mr. A. Randall Wells, who was on the spot during the whole building, and conducted all the arrangements for the fitting of the church as described in your issue of October 12. I need scarcely add how much the appearance of the church has been due to his personal supervision, and in some cases actual handiwork upon the building. I have asked him to give in his own words the details of construction, the credit of which is entirely due to him.

EDWARD S. PRIOR.

*** The following is Mr. Wells's special description of the construction :—

"This has been the method of construction at Roker: skeleton stanchions of light angle-iron, cross-braced, 15 ft. high (twice the height from floor to springing), having been fixed upright with their ends firmly bedded in the concrete foundations (two to each abutment): the wall was carried up round them; the outside with rough walling; the inside face and middle with concrete. The twin shafts, each 18 ft. in diameter, were built simultaneously, and joined together at the top by a heavy lintel cap. Three stone lintels connected this cap to the outer wall; over these lintels the work proceeded in the same way—an outer case of rough walling, with a core of concrete. The lower part of this core was reinforced horizontally with iron rods over the stone lintels. Four iron rods were attached to the stanchion, and bedded in the concrete core following the sweep of the arch. When the tops of the stanchions were reached, a fresh set of four iron rods were connected with them and carried to the top of the arch, being attached on the way to the ends of the first four rods. At the top the ends were interlaced with those from the opposite side. Spaces the full-way sizes of the concrete purlins and ridge were left in the backs of the arches, and the Kahn bars reinforcing these were, when the time came, fastened to the iron rods in the arch core. The centring of the arches was a simple matter, and the curve had been purposely made part of an ellipse to assist this. The first 14 ft. was built against light, wooden templates, and this left only a height of 20 ft. by a span of 36 ft. to provide centres for.

"In an interesting letter a question has been asked, 'Is there anything visible to suggest other than ordinary stone construction?' The construction is, we think, an obvious deduction from the total effect. Rough stonework in any masses implies a core. The inference in these days would naturally be a cement concrete core. In heavy arches in which economy has been effected by constructing them, not of worked voussoirs, but of roughly-dressed quoins and wall stones, and which are connected together with concrete beams; it should be apparent that advantage had been taken of the one important modern addition to building materials, *i.e.*, reinforced concrete."

PIRANESI.

SIR,—It seems not a little singular that two presumably eminent divines, when asked to bear testimony to the value of a publication on the Classic Orders, with variations, should have expressed their approval almost in the same terms. In your last issue, in the article on Piranesi, you quoted an extract from the letter of the Abbot of the Regular Canons of San Salvatore of January 25, 1756, in which he says: "I have found nothing in it" (referring to Piranesi, "Della Magnificenza Ed' Architectura di Romani") "contrary to religion or morality." Nearly 200 years earlier, Henri van Dunghem, doctor and canon in Antwerp, when asked by I. Vredeman de Vries, of Antwerp, for a similar testimony on a book of the five Orders, also with variations, published in November, 1577, writes: "In this artificial development of

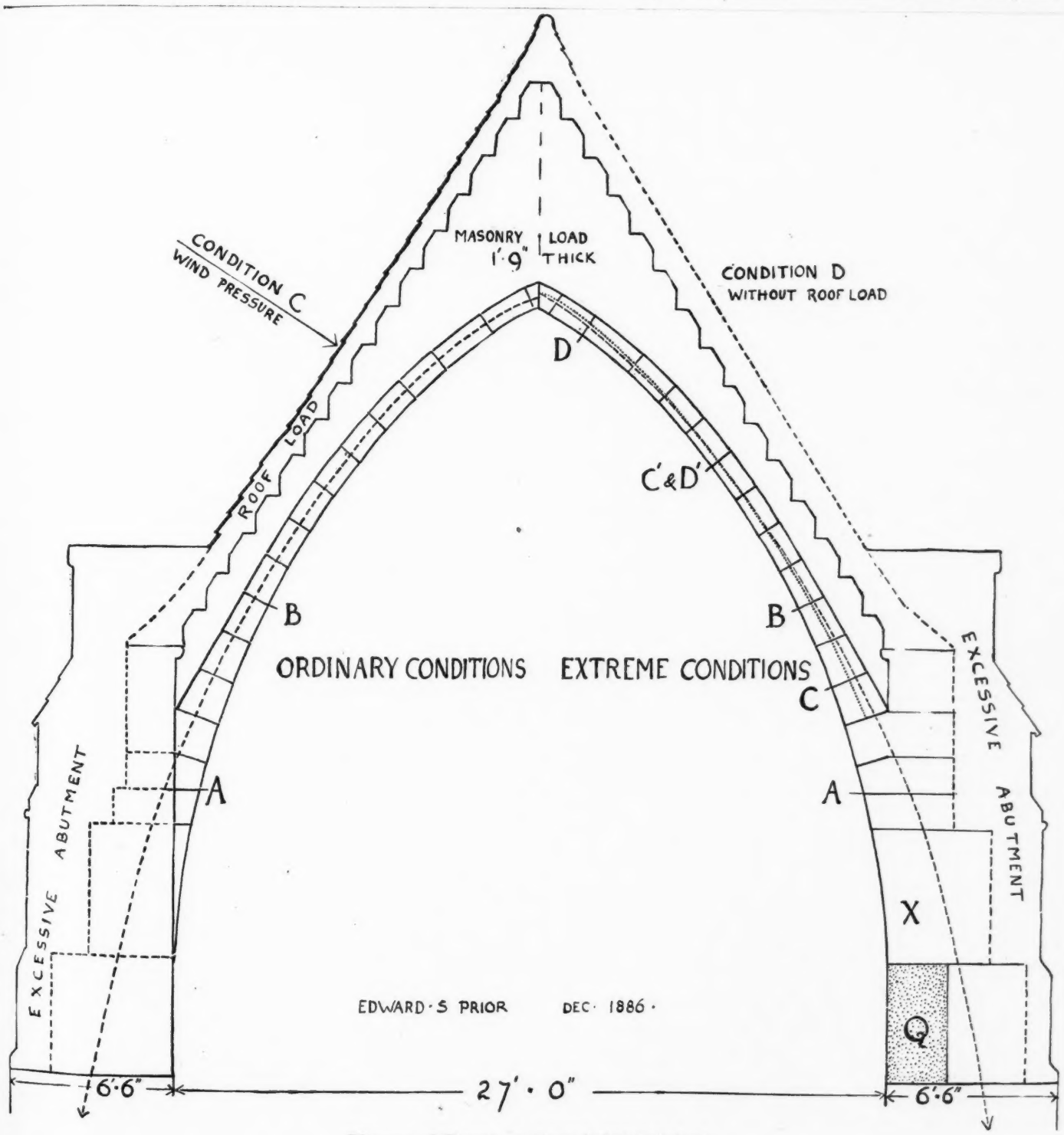


Diagram of Stresses on Stone-Arched Principals.

architecture, there is nothing which is contrary to the Saint Catholic Church and Roman religion." Although he qualifies his approval by the use of the term "artificial," he says nothing about the morality of the book, and perhaps wisely, as it constituted the principal copybook of the Rococo style introduced into England at the close of the XVIth century, and of which Wollaton Hall (1580-86) is perhaps the earliest example; this was followed, among other buildings, by Bramshill, Hants (1607-12), and Holland House, Kensington (wings and arcades 1624), in both of which de Vries's applications of the Orders would seem to have been copied almost literally. Some of John Thorpe's drawings in the Soane Museum suggest also that he was well acquainted with the work. I do not think that Piranesi's book (already quoted) had any following in England, but his work on "Vasi, Candelabri, Cippi," etc., published in 1773, was apparently the precursor of the "Style de l'Empire" in France.

R. PHENE SPIERS.

THE LONDON SCHOOL BOARD OFFICES.

SIR,—Bodley and Garner were lovely and pleasant in their lives, and I am far from wishing now to separate them. Both were my lifelong friends. The former had been a guest at my house for more than a week when convalescent after the illness which left him with a rigid leg. With the latter I had worked at an adjoining desk for three years in Sir Gilbert Scott's office. Yet truth is truth, and your editorial of Nov. 9 compels me to add some words.

I advised the School Board in the competition which Mr. Bodley won; I was present at every Committee meeting which he attended; I had to confer with him on points of detail during the progress of the work; and never till now—more than thirty years after—have I heard the name of Mr. Garner in connexion with it.

Anyone who knew intimately the mind of the designer must see that the handwriting on the wall externally, and the character of the work internally, alike show the hand of Mr. G. F. Bodley.

In a much smaller way the case is reminiscent of that over the Houses of Parliament and the names of Barry and Pugin.

E. R. ROBSON.

*** It may be remembered that when the point was first raised by a correspondent, we observed that we had always heard the design attributed to Bodley. Our note of November 9 was founded on information derived from a correspondent who was at that time in Bodley & Garner's office either as pupil or as draughtsman. We have now Mr. Robson's important testimony in favour of our original view. We must leave our readers to their own conclusion as to which is most likely to be right.—ED.

"HUMPHRIES, JACKSON, & AMBLER, LTD."

SIR,—We have just had our attention drawn to the paragraph under the heading of "Miscellaneous" in your issue of November 16. We are afraid that some of your readers might infer from this paragraph that the firm of George Wragge, Ltd., had become extinct; this is not so, but is still being carried on by the limited company with that title. We, the members of the above firm, simply seceded from the firm of George Wragge, Ltd., after Mr. George Wragge had retired, and commenced business on our own account, as stated in our circular letter.

(For Humphries, Jackson, & Ambler, Ltd.)
SAMUEL HUMPHRIES, Director.

***We very much regret that we should have been misled into a statement that the firm of Messrs. Geo. Wragge & Co. had ceased to exist as such, but we must say that it is not our fault. Messrs. Humphries, Jackson, & Ambler, from the fact of their writing to correct the statement, evidently did not intend to convey any such impression, but the wording of their circular was such as to lead quite naturally to it. They should have been more explicit in their statement. We have formally corrected the error under the heading "Professional and Business," under which it originally appeared.—ED.

HONOUR FOR AN ARCHITECT.—It is announced that the honour of a Privy Councillorship has been conferred upon Mr. Robert Young, J.P., head of the firm of Messrs. Young & Mackenzie, architects and civil engineers, of Belfast. Mr. Young was born in 1822, at Abbeyville, Whiteabbey, and received his early education in the old Belfast Academy.

The Student's Column.

MODERN METHODS OF USING GAS.—XIX.

Minor Industrial Appliances.

GAS FORGES.—Steel tools are liable to be injured by sulphur in the combustion products, and by the excess of oxygen in the air-blast, when forged by a blast coal-gas flame; but in the Fletcher gas forge shown in Fig. 39

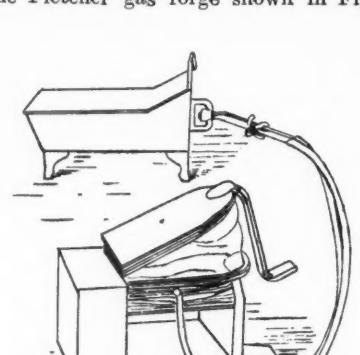


Fig. 39. A Gas Forge.

the gas flame is used only to heat a bed of small pieces of coke. The following are the instructions issued with the forge: Fill the hearth with coke, broken small; light the gas at the blowpipe and use the blower. In a minute turn the gas out, and then turn on again a very small quantity, not enough to burn at the blowpipe jet, but sufficient to visibly brighten the fire. When the heat is obtained, the forge may be worked with or without gas; but a little gas doubles the power. The gas must not burn at the blowpipe jet except for the first minute.

Flame emitted from the burning coke cannot oxidise the steel because oxygen in the presence of an excess of incandescent carbon is converted into carbon monoxide, and when this gas burns to carbon dioxide in air under normal pressure the flame has a reducing action.

Tempering Plates.—For tempering saws, drills, and other tools, a metal plate heated by a large number of small burners fitted beneath the plate is used. The burners are usually fitted in parallel rows running the whole length of the tempering plate, and each row is provided with a control tap. The burners must not be placed very close to the under surface of the plate. There must be sufficient space between the tips of the flames and the plate to allow complete combustion of the gas to take place, and to enable the products of combustion to escape freely.

Circular Blast Burners.—The ease with which gas burners of any shape can be constructed is an advantage which often causes gas to be selected in preference to any other form of fuel. The circular blast burner made by Fletcher, Russell, & Co. (Fig. 40)

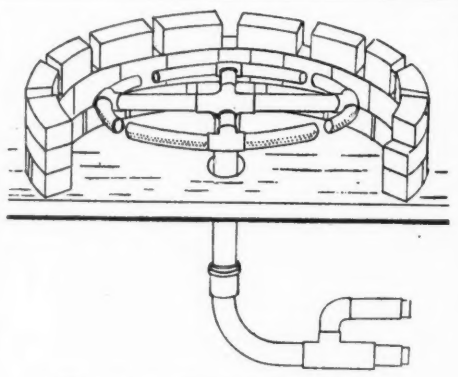


Fig. 40. A Circular Blast Burner.

for expanding tyres on wheels is a good illustration of the ready adaptability of gas for any kind of heating.

Tailors' Irons.—Irons heated by gas are extensively used by tailors. In automatic heating stoves a separate compartment is provided for each iron. Each compartment has a door; the act of closing the door causes the gas valve to open, and the gas is ignited by a pilot light. The act of removing the iron opens the door, and the gas valve is, in consequence, closed. The gas is therefore burning only while the iron is being heated. In self-heating tailors' irons the gas is conveyed by flexible tube from the gas supply pipe to a burner which maintains a flame in the body of the iron.

Laundry Irons. — Self-heating laundry irons and automatic stoves for heating ordinary laundry irons are very similar to those used by tailors. The differences are mainly those of size and shape.

Soldering Bolts.—The soldering bolt may be heated in a small stove specially constructed to heat one or any desired number of bolts, or the bolt may be of the "self-heating" type. In the latter case, a Bunsen tube passes horizontally through the handle of the bolt, and one end of the Bunsen tube is connected by flexible tube to the gas supply. Ignition of the gas flowing through the open end of the Bunsen tube produces a flame which plays upon the copper bit and maintains it at the required temperature. For heavy work a self-heating bolt fed with town gas and compressed air is used.

Gassing Frames.—In Yorkshire and Lancashire gassing frames are extensively used for burning away the down or very fine fibres from yarn. Some of these consume gas at a rate of from 500 to 1000 cubic ft. per hour. A novel form of gassing frame fitted with Rivett's vertical burners and patent drums was shown at the gas exhibition recently held in Manchester. In this frame a slotted shield is placed around each vertical flame, and the yarn to be gassed passes upward within the shield and comes in contact with the whole length of the flame.

Miscellaneous Appliances.—Among other gas-consuming appliances which are extensively used in workshops, but which do not call for special description, are stoves for heating glue-pots, ladle furnaces for melting metal, tinning baths, and heaters for branding irons.

WESTMINSTER CITY COUNCIL.

AT the fortnightly sitting of the Westminster City Council on Thursday, the 14th inst., the following matters were dealt with:—

Acme Flooring and Paving Company.—A letter was considered from the solicitors of the Acme Flooring and Paving Co. (1904), Ltd., with reference to a settlement of their action against the Council in which the company offered to accept 500*l.* in settlement of an amount of 1,104*l.* 1s. 9d., which the Council had always admitted to be due and to withdraw the rest of their claim and bear their own costs, the Council, on the other hand, to withdraw their counterclaim and bear their own costs.—It was agreed to accept the offer.

Armouring of Macadam Roads.—The Highways Committee reported having considered a letter from the Durax Dustless Roads, Ltd., of 95, Gracechurch-street, E.C., asking the Council to make a trial of their Durax Armouring on some of the macadamised carriageways in the City, such trial to be carried out at the cost of the company. The armouring in question consists of machine-made more or less cubical pieces of granite laid in a mosaic form of paving and grouted with cement or pitch. It is often laid on old macadam without other foundation.—It was agreed to accept the proposal subject to a minimum area of 200 sq. yds. of roadway being treated, the work to be done by and at the expense of the company, subject also to the company depositing with the Council for twelve months a sum of money sufficient to cover the cost of reinstating the macadam roadway disturbed for the purpose of the trial, should the Council deem such reinstatement necessary, and that the trial be made in Hill-street, Knightsbridge.

Holborn to Strand Improvement.—Correspondence having passed between the City Council and the London County Council in regard to the taking over of the new and widened streets of the Holborn to Strand Improvement, it was agreed to continue the cleansing and maintenance subject to an assurance by the County Council that they will not give permission for the construction of cellar-flaps in the public way of the streets in question without the consent of the City Council, or for the construction of pavement lights of a greater projection than 1 ft. 6 in. where the footway does not exceed 5 ft., and 2 ft. where the footway is over 5 ft. in width.

Obituary.

MR. W. SMITH.—The death took place on the 18th inst. at 29, Carlisle-terrace, Plymouth, of Mr. William Smith, of Manaccan, at the age of ninety-one years. Mr. Smith at one time conducted a private school at Manaccan, but later became a surveyor. Prior to the building of the Cornwall Railway he surveyed a large portion of the land, and assisted Brunel, who erected the Royal Albert Bridge at Saltash, in the surveying portion of the undertaking. Mr. Smith acted as clerk of the works at Princetown Convict Prison whilst extensions were in progress during the middle of last century.

General Building News.

MEMORIAL CHURCH HALL, HUCKNALL.—The Godber Memorial Church Hall has just been opened at Hucknall Torkard. The site adjoins the old parish churchyard on the west side, and has frontages of 100 ft. wide to Ogle-street on the north side, and West-street on the south, with a depth of about 380 ft., and an area of nearly an acre. The ground floor is chiefly devoted to recreation rooms, the largest room—53 ft. by 29 ft.—being divided by folding partitions for this purpose. The large hall on the upper floor—80 ft. by 37 ft.—is capable of seating about 700 people, exclusive of the raised and recessed platform, and is divisible into three portions by folding partitions. At one end a music room has been arranged, and at the other a suite of service rooms, consisting of kitchen, scullery, store rooms, &c. The heating chamber is placed in the basement. The walls are of brick faced externally with red brick and stone dressings, the roofs are slated, the floors of concrete, while canary wood, unpainted, has been largely used in the interior. The estimated cost of the building and furnishing was 5,680*l.* Mr. Louis Ambler, of London, was the architect; Mr. David Davies was clerk of the works. The builders were Messrs. Thomas Fish & Sons, Nottingham.

HOLY TRINITY CHURCH, EXMOUTH, DEVON.—This church was consecrated on Wednesday, the 30th ult. The original church was built for Lord Rolle in 1824, from the designs of Mr. R. Lethbridge, architect, of Exeter. In recent years the church had been showing signs of serious decay, and in 1903 the late Hon. Mark Rolle consulted Mr. Geo. H. Fellowes Prynne, with the result that it was found necessary to entirely remodel and rebuild the nave and tower, and add a new chancel, chapel, and vestries. The new chapel has been dedicated to the memory of the late Hon. Mark Rolle, to whose generosity the Building Committee are indebted for a considerable portion of the funds raised to meet the expense of rebuilding the church. The stained-glass windows in this chapel, and in the sanctuary and nave, are the work of Messrs. Percy Bacon & Bros., of London. The whole of the details and furniture of the church have been carried out from the designs, and under the direct supervision, of the architect. The contract amount was about 13,000*l.*; and the restoration has been carried out by Messrs. R. Wilkins & Sons, of Bristol.

ILFORD HIGH-STREET BAPTIST CHURCH.—This building was opened on Wednesday, the 13th inst., and has cost about 5,500*l.* The style is in late Gothic. The church accommodates about 950 persons. A large institute and school is to be erected on the same site. The architects for the scheme are Messrs. Geo. Baines & Son (London), whose designs were selected in competition. The contractors are Messrs. Kerridge & Shaw (Cambridge).

NEW CHURCH, DUMBARTON.—The memorial stone was recently laid of the new Free Church at Dumbarton, which is being built by the local Free High congregation. The church is to cost 3,500*l.*, and is from the design of Messrs. Halley & Niel, architects, Clydebank and Glasgow. The building embraces a church capable of accommodating 630 worshippers, as well as a hall.

BAPTIST SCHOOL-CHAPEL, EPSOM.—A Baptist school-chapel has been built in Church-street, Epsom. It was designed by the Rev. T. F. Waddell, of Dorking, and the builders were Messrs. Williams & Taylor.

CHURCH ROOM, YIEWSLEY, MIDDLESEX.—A church room is being erected in this village at a cost of 1,228*l.* from plans by Mr. A. H. Winterbourne, architect.

RAGGED SCHOOL, COVENTRY.—New premises are to be erected for the Coventry Ragged School on a site in Priory-row. Mr. H. Quick has been appointed architect of the work.

ELEMENTARY SCHOOL, LITTLE BOWDEN.—A new elementary school has been erected at Little Bowden by the Education Committee of the Leicestershire County Council. The school will accommodate 450 scholars, and contains nine classrooms for fifty children in each. The architects were Messrs. Coales & Johnson, of Market Harborough, and the contractor was Mr. Thos. Hickman. The contract amounted to 4,760*l.*

SCHOOLS, WALTHAMSTOW.—A large block of schools at Winns-avenue was opened on the 31st ult. They consist of four departments—viz., boys', girls', junior mixed, and infants', housed in separate blocks, each block accommodating 440 scholars, making a total accommodation of 1,760. Separate buildings for cookery and laundry (two-floor block) and manual centres are provided, also a caretaker's house. The buildings are faced with "Redbank" red pressed bricks, relieved by Portland stone dressings, and the roofs are slated with blue slates from the Oakeley Quarries. The schools are planned on the central-hall system, with classrooms grouped around them. The central halls are 55 ft. by 27 ft., and have clearstory windows. Teachers' rooms are provided (two to each block), also commodious cloak-rooms, lavatories, stores, etc. Rapid ingress and egress is provided for, there being four outer doors to each department—two front entrances and one at each end—which allows of quick and easy marshalling of the scholars to and from their respective rooms. The floors of classrooms and central halls are of maple blocks, the galleries in classrooms are sloped instead of stepped, and all inner walls have a glazed brick dado 4 ft. high. Large separate playgrounds for each department, with playsheds, are provided. The sanitary fittings were supplied by Messrs. G. & D. Musgrave, Ltd., and the out-offices have separately trapped pans, automatically flushed. The lighting throughout is by electricity, and was installed by the District Council's staff. The heating (by Messrs. Jas. Boyd & Sons) is on the low-pressure system; four different makes of boilers have been put in to test their relative efficiency. The "Reck" patent system of steam-heated water has been installed in the infants' block. The playgrounds will eventually be tar-paved. The contract amounted to 24,301*l.*, and has been carried out by Messrs. J. S. Hammond & Son, of Romford, from the designs of Mr. H. Prosser, architect to the Walthamstow Education Committee.

COUNCIL SCHOOL, SHEFFIELD.—A new Council school has been opened in Lydgate-lane, Crookes. The building is a two-story structure of stone, and affords accommodation for 340 infants on the ground-floor, and 340 older children in a mixed department on the upper floor. The accommodation is provided in class-rooms, of which each department has six, arranged round three sides of the assembly halls, the fourth side being kept clear for lighting and ventilation. The total cost of land, buildings, caretaker's house, professional charges and furnishing has been 13,045*l.* Mr. W. J. Hale, architect, prepared the plans.

SCHOOL OF ART, AYR.—There has just been inaugurated, in connexion with Ayr Academy, a new art school, the building and equipping of which has cost over 8,000*l.* The structure, which was designed by Mr. J. A. Morris, architect, Ayr, is separate and to the north of the main and older building. The building is of four stories, including an underground floor, which contains the heating apparatus, etc. The first floor is mainly occupied by a technical workshop, and an architectural, building construction, and mechanical drawing lecture room, both fitted up with the newest appliances for the teaching of arts and crafts. On the second floor there is a studio. On the same floor there is also a modelling room fitted up for elementary school work, also modelling from life. On the top floor there is another small life studio, and a painting gallery abutting on the modelling room. Nearly the whole of the north side of the building is glass, and artificial light is supplied by the electric light.

SCHOOL REBUILDING, SALTERHEBBLE.—The old All Saints' School at Salterhebble is being rebuilt from designs by Messrs. Joseph F. Walsh & Graham Nicholas, architects, of Halifax. The new building is one story high, and the elevations are in local stone dressings. Internally, the walls have a dado of brown glazed bricks. The floors of all classrooms are to be formed of maple boards. The heating and ventilation are a combined system of low-pressure hot-water ventilating radiators, heated by one of Messrs. Lumby, Son, & Wood's cast-iron sectional boilers, with extraction shafts connected with turret ventilators, by Messrs. P. M. Walker & Co., of Halifax. The contracts have been let to the following local firms:—Mason's and bricklayer's work, Mr. Wm. Kershaw, of Warley, Halifax; carpenter's work, Messrs. Frank Moore & Sons, Claremount, Halifax; plumbing and glazing, Mr. Louis Tomlinson, Salterhebble; plastering, slating, and concreting, Messrs. Joseph Bancroft & Co., Halifax; iron and steel work, Messrs. Abraham Pulman & Son, Ltd., Halifax.

UNIONIST LABOUR CLUB, ASTON.—Mr. Balfour recently visited Aston to open the new Unionist Labour Club premises which have been built there. The building occupies the rounded corner at the junction of Park-lane and Park-road, Aston Cross, and is carried out in "Fordstone" and thin red bricks, with a preponderance of stonework. The architect was Mr. A. Gilbey Latham, and the general contractors Messrs. W. J. Whittall & Sons. The cost of the building is about 4,000*l.*

MUNICIPAL SLAUGHTER-HOUSE, FRASERBURGH.—A new public slaughter-house has been erected in this town. The building includes a killing-house 90 ft. long and 21 ft. broad with flooring of specially hardened cement, sloped to the centre, with a groove running along for drainage. Adjoining are four byres, each capable of accommodating sixteen cattle. On the outside court-yard are several large pig and sheep pens, and another killing-house for these animals. The total cost of the building, which was designed by Mr. William Alexander, Burgh Surveyor and Sanitary Inspector, is 1,200*l.*

CO-OPERATIVE PREMISES, WALSALL.—The new central premises for the Walsall Co-operative Society, situated in Bridge-street, have just been opened. The front elevation of the building is built of Darley Dale stone, the piers to shops in Aberdeen granite, and panels and wall spaces with Ruabon red brick, the back of the building being in local brick. All floors and beams are fireproofed. The architect for the building is Mr. R. Worcester, Manchester; the builders being Messrs. Kendrick and Son, Walsall; and shopfitters, Messrs. Harris & Sheldon, Birmingham; and Parnalls, of Bristol. The clerk of works was Mr. G. Rutherford.

STATE OF THE BUILDING TRADE AT PAISLEY.—At a recent meeting of Paisley Dean of Guild Court Dean of Guild M'Naughton stated that during the past year seventy-seven applications for linings had been brought before the court as against seventy-nine in the previous year. The total value of the property in question amounted to 118,420*l.*, an increase of 3,110*l.* as compared with 1906. Amongst the properties passed were ten four-story tenements, four three-story tenements, seven villas, and thirty-six semi-detached villas, halls, etc., the remainder of the applications being made up of altorations and additions. Permissions were also granted in twenty-one minor cases by the Master of Works in virtue of the powers conferred upon him by the Paisley Police Act, 1901.

HOUSING SCHEME, NEWBURN.—The Newburn Urban District Council have decided to enter into negotiations for the provisional purchase of two acres of land at Leamington for the erection of houses, subject to the approval of the Local Government Board. The scheme, which has been prepared by the Surveyor (Mr. Thomas Gregory), provides for the construction of forty-nine dwellings, each with a frontage of 16 ft. 5 in. The houses are estimated to cost 11,300*l.*, or about 230*l.* each.

LEICESTER INFIRMARY EXTENSION.—A south-east wing has been added to the infirmary at Leicester. The new building is of three stories, and provides in its three wards for ninety-nine beds. The wing is separated from the old build ing by bridges, cross-ventilated, with an open-air space between each floor, for the free circulation of air between each bridge floor. In addition to this extension the laundry has been enlarged and improved. The building contract for the new wing amounted to 15,011*l.*, and, adding the cost of the furnishing, the total outlay will amount to about 18,000*l.* The cost of the laundry extension will be 1,500*l.*, bringing the toal expenditure in connexion with this portion of the infirmary extension and remodelling scheme to close upon 20,000*l.* Messrs. Everard, Son, & Pick prepared the designs from which the new wing has been erected, and the whole work has been carried out under the supervision of Mr. S. Perkins Pick. Messrs. Everard & Pick are also the architects for the new nurses' home, the building of which will be started upon probably in January. The home will be to the south-west of the infirmary site, and will consist of a main building four stories high.

Appointments.

BRADFORD.—At a recent meeting of the Bradford Board of Guardians the minutes of the Finance Committee recommended that a gentleman should be appointed to act as Architect, Engineer, and Assistant Surveyor to the Board, and that he should devote his whole time to the duties of the office, being provided with accommodation at the Board's offices, with a salary of 325*l.* per annum. It was further recommended that the post should be offered to Mr. Fred Holland, and that, failing his acceptance, applications should be invited. After a discussion, in the course of which an amendment to the effect that the post should be thrown open to competition was moved but not adopted, the Chairman gave notice that at the next meeting he would move the appointment of Mr. Holland, who had written stating that he was prepared to accept the position on the terms laid down.

LONDON. — Mr. G. W. Chilvers, C.E., M.R.San.Inst., has been appointed, in consequence of the death of the late Mr. E. Tidman, C.E., the Surveyor and Secretary to the London and Suburban Sanitary Survey Association, 28, Victoria-street, S.W., with which his private practice has been merged.

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LISBURN SEWAGE WORKS.—This scheme, entered upon a couple of years ago, has now been completed. The site of the filter-beds and sewage farm is a piece of land, about 20 acres in extent, close to Hilden Mills, the distance from Lisburn being about 1¼ miles. The whole system is fitted with automatic flushing pipes. The total cost of the work is estimated at nearly 40,000*l.* The plans were prepared by Mr. G. Midgley Taylor, M.Inst.C.E., F.C.I., F.R.S.I., London, and the work was most capably carried out under his supervision by Messrs. Firth & Co., York. Mr. Herbert Wragg superintended the scheme on behalf of the contractors, and Mr. J. H. E. Griffith, C.E., was the resident engineer.

THE SANITATION OF WHITBY.—Dr. Reginald Farrar's report to the Local Government Board upon the sanitary condition of Whitby has now been issued. The water supply of Whitby, Dr. Farrar says, is remarkably pure and of excellent quality for drinking purposes and general household use, and the town is well and efficiently sewered. In most parts of the town the pipes have a good fall, but it cannot be denied, he adds, that the present method of sewage disposal involves a serious nuisance. The worst nuisance, one which is immediately obvious at low tide, arises, Dr. Farrar says, from the considerable volume of sewage poured into the harbour above low-water level by the Bogdale Beck sewer, which discharges directly under the entrance of the railway station. Dealing with the alternate schemes for the final disposal of the sewage, Dr. Farrar remarks:—"Messrs. Sundeman, the engineers of the harbour extension scheme, make the following proposal:—Instead of the present shallow and low-water channel from Whitby Bridge to the pier-head, there will be provided a channel having a depth of 7 ft. below low-water of spring tides, and a minimum breadth of 115 ft. at low-water. The deeper channel will give a greater velocity to the ebb current, and thereby cause a greater scour of the harbour bottom." With respect to housing conditions in the town, Dr. Farrar says that much of the property is insanitary; and in concluding makes the following recommendations:—"(1) I strongly recommend that the Urban District Council should adopt a scheme, or schemes, for the housing of the working classes. (2) Steps be taken to improve the existing conditions under which the sewage is discharged. (3) The Urban District Council should take into serious consideration the question of providing a public abattoir, as recommended by their Medical Officer of Health."

NEW SEWERAGE SYSTEM, ABERDEEN.—The first portion of an extensive improved sewerage system for the city of Aberdeen has just been inaugurated. It formed part of a comprehensive scheme entered upon under the Aberdeen Corporation Sewerage Act of 1898-99, and included the construction of a high-level outfall sewer, over three miles in length, from Skene-street to an outfall below low-water mark at the foreshore of the Bay of Nigg, in the county of Kincardine. The sewer is designed to discharge by gravitation, at Girdleness Point, the whole of the sewage of the city, with the exception of that of two low-lying districts—one at Abercrombie's Jetty, and the other near the Victoria Bridge, connecting Aberdeen proper with the Torry district—and is capable of discharging 81,000,000 gallons per day, or a quantity equal to the necessities of an estimated population of 270,000, at the rate of nearly six and a half times the daily dry-weather flow of sewage, which is approximately 45 gallons per head. All the storm water in excess of this quantity will pass by means of overflows to the rivers Dee and Don or their tributaries. The sewage from the two low-level areas is dealt with by sewers discharging into the river Dee and the tidal waters at the harbour entrance respectively. Another important section of the new sewerage system for the city is in course of being carried out in the northern district, and includes the construction of a high-level intercepting sewer four miles in length and extending from Woodside and joining the Girdleness high-level sewer at the Victoria Bridge. Up to date over 130,000*l.* has been spent on the new works. The section just opened has occupied exactly six years in completion, and presented considerable engineering difficulties, particularly in the tunnelling of St. Fittick's Hill between the river Dee and the outfall at Girdleness, and in the construction of the foreshore portion of the works, which were frequently stopped by storms. The sea outlet is 21ft. below high-water mark, and pipes leading thither are protected by masses of concrete dovetailed into the rocks. The total cost of the section of the sewerage scheme just opened has been about 80,000*l.* The works were designed by Mr. William Dyack, C.E., Burgh Surveyor of Aberdeen, and the contractor was Mr. Peter Tawse, of Aberdeen.

SANITARY CONDITION OF THE ABERAYRON DISTRICT.—Dr. W. W. E. Fletcher's Report to the Local Government Board upon the sanitary circumstances and administration of the Aberayron Registration District, comprising the Rural District of Aberayron and the Urban Districts of Aberayron and New Quay, in Cardiganshire, states that while the bulk of the houses are substantially built of local stone with roofing of flags or slates, there are many cottages constructed largely of clay, and thatched with straw resting upon gorse, or furze, which, in turn, rests upon interlaced twigs and sticks supported by the rafters. These roofs are frequently not ceiled, so that from the interior the interlaced sticks forming the foundations of the roofs are readily visible. This arrangement offers every facility for the collection of dust and dirt, cobwebs, etc., and such dwellings cannot be kept properly clean and sweet, while thorough disinfection after the presence of infectious disease is impossible, and attempts to secure it nothing but a farce. Throughout the district water is obtained from wells or from so-called "springs," even the large villages, Llanon, Llanddewi Aberarth, and Llanarth, are without any public service. The wells sunk into the ground—in contradistinction to so-called "wells," which are merely holes in banks, or by river sides—covered over and furnished with pumps, were, with one exception, merely surface wells, and the pumps ordinary suction pumps. The single exception was the well on The Green, at Llanon. This is said to be some 60 ft. in depth, and is furnished with a deep well pump. There is, however, no evidence to show that this well is steined in a watertight manner down to an impervious stratum from below which it draws its supply; and failing such construction it must be fed, in part at least, by top-soil water. In fact, the whole of the district is dependent for water supply upon such water as can be gathered from the top-soil, or immediately underlying subsoil. Water of this class is well known to be liable to serious pollution. The usual method of excrement disposal in the district is by means of either privies with cesspits, or pail-closets. The cesspits are not rendered impervious by brickwork or masonry, so that deposits therein percolate freely into the surrounding subsoil; moreover, they are very seldom emptied; some, indeed, appear not to be emptied for periods of years. The pail-closets observed were not in any instances properly constructed. Any sort of bucket is placed beneath the seat without any preparation of the space around. In almost every village and hamlet visited instances were noted in which there were no closets of any description. There are no sewers in any part of the district, and very few of the houses are provided with drains. The slops and waste-water from most of the houses and cottages are thrown out anywhere, on to the roads, or gardens, or yards; into ditches or streams; or on to heaps of manure or refuse, deposited frequently in proximity to dwellings. Dr. Fletcher, commenting on the general condition of the district, observes:—"It is not necessary to dwell, or to comment at length, upon the shortcomings of this Rural District Council. Sufficient has been said to show that there has been no serious attempt on the part of either the old Rural Sanitary Authority or the present District Council to perform their duties in an efficient manner, and the results of their neglect are visible throughout the district."

Foreign.

FRANCE.—M. Antonin Carlés, the sculptor, has completed a bust of the President, which is to appear in the next Salon.——The Municipal Council of Paris have authorised the Committee of the New Salon to arrange for an exhibition, at the Château de Bagatelle next year, of portraits of eminent persons of the XIXth century.——The busts of Victor Hugo, Dalou, Eugène Guillaume, and Henri Rochefort, are to be placed in the building of the Institut de France.——The bust of Rousseau, by Carrier-Belleuse, is to be set up at Montmorency on a pedestal specially designed by M. Ponsin, architect, of Montmorency.——The Society of "Amis de Nouveau Nancy" have decided on the erection of a Comedy Theatre to be built at the Croix de Bourgogne, from the designs of M. Biet. The building is to cost 500,000 francs.——The works are shortly to be commenced for the reconstruction and enlargement of the railway station in the Rue Verte, at Rouen, at a cost of 3,800,000 francs.——M. Darcourt, architect, has been commissioned to prepare the plans for a new abattoir at Peronne.——A new cavalry barracks is to be built at Luçon (Vendée), at a cost of 1,600,000 francs.——M. Max Doumie, architect, who obtained the Prix du Salon for architecture in 1904, has been commissioned to organise an institution for instruction in architecture at Montreal.——There has just been completed in the XVIIIth Arrondissement of Paris, over the Ceinture Railway, the first bridge in ferro-concrete built in Paris, under the direction of M. Vasseur, engineer in the Municipal service.——A new theatre is shortly to be built in the Champs Elysées, of which MM. Roger Bouvard and Henri Fivaz will be the architects. The cost will be 271,000 francs.——The death is announced, at the age of seventy-nine, of the sculptor, Charles Pêtre, honorary director of the Art-school at Bourges, and curator of the Museum in the same town. He was a pupil of Toussaint. Among his principal works are the statue of Maréchal Ney at the entrance to the esplanade at Metz; that of Michel de l'Hopital in the Palais de Justice of Metz; and that of Jeanne Darc at Neufchâteau; the bust of Canrobert in the museum at Nancy; a Saint Etienne in the Cathedral of Metz; a group entitled "La Source," etc.——The death is also announced, at the age of ninety-three, of the painter Gustave Chardier, a pupil of Troyon. He made his *debut* at the Salon of 1841, and exhibited regularly, up to 1870, landscapes with cattle, mostly from scenes in the outskirts of Paris.——Last Saturday the new exhibition of Art applied to Industry was opened in the Musée Galliera at Paris. Among the best exhibits are those of MM. Bouvallet, Delaherche, Dammouse, Moreau-Nelaton, E. Carrière, Pierre Roche, Decœur, and Michel Cazin.——M. Frantz Blondel, architect (Versailles), has been elected President for 1908 of the Society of Architects of Seine-et-Oise.——The jury in the competition opened at Lille for a new theatre have selected for execution the design of M. Cordonnier.——The forty-fourth exhibition of the Société des Amis des Arts at Pau will be opened from January 15 to March 15.——Thanks to the intervention of the Vieux Paris Committee, the four statues by Petitot, which decorate the Pont des Saints Pères, Paris, have been preserved in spite of the enlargement of the bridge, their position only being altered.——It is proposed to destroy entirely the course of the little river called the Bièvre, which runs through the XIIIth arrondissement of Paris, behind the Gobelins, partly open and partly tunnelled over.——Dalou's fine relief, "La République," is shortly to be placed in the Petit Palais in Paris. The late sculptor left it unfinished, and it has been completed by his friend M. Becker.

GERMANY.—In the *Elektrotechnischen Zeitschrift*, Professor A. Korn gives an account of the experiments carried out last spring in telephotography between Munich and Berlin. He states that these experiments over the telephone-wires were as successful as when carried out in the laboratory, and that the connecting up of the instruments is of striking simplicity. The extended use of the invention will depend on its price, and this will be considerably reduced since telephone wires can be used for transmission purposes. It is a noticeable feature that the wire will transmit simultaneously both picture and speech without injury one to the other. This year the telephotograph stations of Berlin and Munich will be connected with those in Paris and London, and soon after with Copenhagen and Stockholm.——The new art gallery in Mannheim which was designed by Professor Hermann Billing, of Carlsruhe, was built in the short space of eighteen months, and, taking into consideration its excellent workmanship and fine materials, for the incredibly small sum of 600,000 marks. The gallery will contain a permanent collection of painting and sculpture, besides housing temporary exhibitions. The main staircase and hall are peculiarly effective, being treated entirely with marbles of different colours, and lighted from the dome above. The constructive material throughout is mainly ferro-concrete.——In the competition for designs for business premises for the Bonn-Burghers Society, two prizes of 1,000 marks each were awarded to Messrs. Schreiterer & Below, of Cologne, and Heinrich Mattar, of Leipzig-Cologne.——In the competition for a general scheme for the new Botanical Gardens, Berlin, eleven projects were submitted. The first prize of 3,500 marks was awarded to Herr Emanuel Heimann, of Neubabelsberg.——The new school and polytechnic built in the Bonifatius Platz, Hanover, was desiged by Messrs. C. Wolff & Rowald, and cost 550,000 marks. The walls are plastered, the dressings and features are sandstone, and the roof is tiled.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Messrs. Benjamin Parker, Ltd. (Birmingham), announce that in future the two managing directors will be Mr. Charles Barter and Mr. A. E. H. Herschel, the latter having taken the place of Mr. Taylor, who has retired from, and now has no connection with, the company.——As will be seen by a letter in our correspondence column, the statement under this heading in our last issue, that the firm of Messrs. Geo. Wragge & Co. had become the firm of "Humphries, Jackson, & Ambler," is entirely incorrect; the latter firm being a new one started by gentlemen who were formerly working in the firm of Geo. Wragge & Co. Mr. Geo. Wragge

has retired from the old firm, which is otherwise *in statu quo*. The circular sent to us should have been more explicitly worded.

LIGHTING AND HEATING EXHIBITION, ST. PETERSBURG.—There are now only a few weeks left in which English manufacturers of lighting and heating appliances can secure space at the International Exhibition of Modern Lighting and Heating Appliances, to be held shortly in St. Petersburg. The Exhibition, which opens on January 28, is to be international in character, and every effort has been made to induce foreign exhibitors to give their support. At present France, Germany, and Belgium are well represented. English exhibits will pass the Russian frontier without Customs examination, and they will, moreover, be imported duty free into Russia. The Exhibition will remain open for one month. The London secretary, M. Paul Dvorkovitz, 45, St. Mary Axe, will be glad to give any information to intending exhibitors.

HOLYOAKE MEMORIAL.—A stone of grey granite carrying a bust executed in white Carrara marble has been erected over the grave of Mr. G. J. Holyoake in Highgate cemetery. Mr. Albert Toft sculptured the memorial.

THE MUNICIPAL ELECTIONS.—Mr. Walter Emden, architect, ex-Mayor of Westminster, is the new Mayor of Dover; Councillor W. Burrell, architect and surveyor, and Alderman Lacy W. Ridge, F.R.I.B.A., V.D., Diocesan Surveyor for Chichester, have been elected Mayors of Lewisham and Holborn. Alderman J. W. Lorden (for the second time) and Councillor Ernest G. Simmonds, builders and contractors, are elected Mayors of the boroughs of Wandsworth and Deptford.

SHREWSBURY ABBEY CHURCH.—Mr. Harold Brakspear, F.S.A., has drawn up a report upon the untoward condition of the upper portion of the west tower of the Abbey church. It is recommended that that part of the fabric should be dealt with forthwith, together with a re-hanging of the peal of eight bells and renewal of the three-dialled clock. About three-quarters in height of the tower have been practically recased during the past two or three years at a cost of some 2,090*l*., under Mr. Brakspear's directions and superintendence, and with the approval of the Shropshire Archæological Society; the chancel, transepts, and clearstory were rebuilt and the nave roof was repaired some years ago. The parochial, as well as monastical, church forms a remnant of the Benedictine mitred abbey dedicated to SS. Peter and Paul, which Earl Roger de Montgomery founded in 1083 upon the site of the former religious house. The precincts extended over 10 acres, and at the time of the Suppression the revenues were calculated at 615*l*. 4s. 3d. per annum.

A THAMES BRIDGE AT TEDDINGTON.—The District Council have resolved to ask the Middlesex County Council to take steps for the construction of a road bridge at Teddington, where there is only a foot-bridge, across the river. They represent that a vehicular bridge is needed to relieve the traffic through the narrow main street at Brentford by providing a direct route from South London to Windsor, and would furnish a more direct route to Bushey Park and Hampton Court from Putney and Kingston Vale through Richmond Park. The south end of the proposed bridge would be close to the tract of land where it is anticipated a river-side promenade and garden will be laid out shortly, which was obtained from the Earl of Dysart for public benefit and uses in pursuance of the Richmond, Petersham, and Ham Open Spaces Act, 1902, in exchange for the surrender of certain common rights in Ham parish.

CAMBRIDGE UNIVERSITY.—The Sites Syndicate have lately consulted Sir Aston Webb, R.A., in the matter of the laying-out of the grounds of Downing College for the erection of additional departmental buildings, which, in their opinion, should be comprised within one general scheme prepared by one architect. The syndicate have chosen a site in the grounds on the south side of the Botany School for the contemplated School of Agriculture, which is now accommodated, as far as the space allows, in the basement of the Chemical Laboratory; towards the estimated cost—20,000*l*.—of the new buildings a sum of 13,000*l*. has thus far been subscribed. The Readership in Classical Archæology, resigned by Dr. Charles Waldstein upon his re-election as Slade Professor of Fine Art, has just been filled by the appointment of Mr. Arthur Bernard Cook, M.A., Fellow and Lecturer of Queens' College, and a Fellow of Trinity in 1893-9. Mr. Cook was a Craven Scholar, and won the Chancellor's Senior Classical Medal in 1891. He graduated with a first-class in Parts I. and II. of the Classical Tripos, and has been Examiner in the section of Archæology of that Tripos; he is a lecturer upon sculpture, architecture, vase-painting, and numismatics, and the author of several papers upon classical archæology and mythology in the *Journal of Hellenic Studies* and the *Classical Review*. Mr. Cook will, it is stated, resign his Professorship of Greek at the Bedford Women's College, London.

MEMORIALS TO THE LATE MR. KEMPE.—A fund is opened with the object of raising memorials to the late C. E. Kempe. The committee seek to collect an amount sufficient for the erection of stained glass windows in Southwark Cathedral and St. Agnes' Church, Kennington, where are specimens of Mr. Kempe's work in decorative glass, and of commemorative tablets in Chichester Cathedral, and Pembroke College, Oxford, of which he was an honorary Fellow. Subscriptions of more than 400*l*. have already been made to the fund by some of Mr. Kempe's personal friends.

DISCOVERIES AT SELBY.—During the course of excavations at the east end of Selby Market-place, and just outside the west gate at Selby Abbey, preparatory to laying down pipes for the conveyance of water to the north side of the Abbey, the workmen came across the foundations of the ancient gateway of the Abbey, which were unearthed. In addition, portions of a brick floor have been disturbed not more than a few inches below the surface.

BUILDING BY-LAWS, HAYWARDS HEATH.—At Haywards Heath, on the 13th inst., a Local Government Inquiry was held relative to by-laws for buildings and new streets in the district of the Cuckfield Rural Council. The Local Government Board representatives were Dr. R. D. R. Sweeting and Mr. B. T. Kitchin, architect. Mr. C. H. Waugh, Clerk to the Cuckfield Rural District Council, in stating the grounds of the application, said there were two sets of by-laws in operation, one since 1883 for Ardingly, Balcombe, Clayton, Cuckfield Rural, Horsted Keynes, Hurst, Keymer, Lindfield, and Slaugham. The Council thought the time had come when some of these by-laws should be remodelled, being out of date. The other set of by-laws, adopted in 1902, applied to the more rural parishes—Albourne, Bolney, Twineham, Newtimber, and Pyecombe. The by-laws at present applied to parishes as a whole. In answer to questions, Mr. Waugh explained how plans were dealt with by the Rural Council, and said there was a need in the rural portions of parishes for workmen's cottages, that the urban code had worked satisfactorily in the urban portions of parishes, but less restrictions were necessary in the rural parts. It was not proposed to extend the urban by-laws, but to bring the rural parts of parishes under the less restrictive code. Mr. W. Beach, Plans Surveyor, said he had no objection to wooden houses if isolation space was ensured. He had very little to complain of as to local builders, but they had to guard against the inconsiderate outsider and speculator. Mr. Hugh Stott, Medical Officer of Health, thought it was much better to have simple by-laws, so long as the health requirements were obtained—ventilation of rooms, cubic space, and good drainage. The simpler the by-laws the better they were carried out, and the better enforced. Other evidence having been given the inquiry was adjourned, the Inspectors stating their intention to visit the district.

A NEW SLAB PARTITION.—Architects have long recognised the advantages to be obtained by the construction of partition walls of perfectly dry materials requiring neither plaster or any other cement as a surface finish, and, therefore, capable of being papered immediately after completion. It is claimed that this desideratum is fulfilled by Propper's slab partition system, now being introduced into Great Britain by Messrs. Charles Ingram & Co. The partition is built up of cruciform slabs, the edges of the arms being tongued and grooved, so that interlocking joints are provided vertically and horizontally parallel to the plane of the partition and perpendicular to the same plane. Thus the partition is able to withstand as a whole forces applied axially either from the top or from one end, and at the same time to resist forces tending to cause flexure or displacement of the slabs. Further, it is claimed that no uprights of any kind are required for the lateral support or stiffening of the construction. The slabs measure 12 in. by 12 in., the arms of the cross being 6 in. wide by 3 in. long, and the thickness is from 2½ in. to 4 in. Up to the present the slabs have been produced in gypsum, but any other material of suitable character might be employed with the object of providing greater strength and resistance to fire. According to tests made at Zurich by M. Schüle, the Director of the Laboratoire Fédéral d'essais de Matériaux the absolute resistance of gypsum slabs to compression is from 883 lb. to 910 lb. per square inch. Two pairs of Propper's slabs built up as they would be in a partition failed under loads of 440 lb. and 470 lb. per square inch, and two sets of three slabs similarly disposed failed under loads of 356 lb. and 500 lb. per square inch. The tests were not extended to higher series of slabs, and, therefore, we have no clue to the resistance of partitions as required in actual practice. Moreover, no tests were made of the lateral resistance possessed by the slabs when built in the form of partitions. A perfectly horizontal basis is the only essential for the erection of the Propper partition, the slabs of which are laid in directions indicated on the sides as a guide to the builder. At each end of a partition the serrated edges, which would be left by the cruciform slabs, are sawn off so as to make a perfectly level surface, or in cases where two partitions meet the projecting arms are dove tailed. Spaces can be left for door and window-frames, the projecting arms of the slabs being cut off, and the timber frames nailed to the partition. Any slight unevenness which may be evident at the joints can readily be removed by scraping, and the surface is then ready for papering.

GLASGOW ARCHITECTURAL CRAFTSMAN'S SOCIETY.—At a meeting of the Architectural Craftsman's Society in the Technical College, Glasgow, on the 8th inst., Mr. A. L. Currie, President, in the chair, Professor Charles Gourlay, B.Sc., A.R.I.B.A., delivered a lecture on "The Parthenon and Its Reproductions." After referring to the beauty of Athens, its Acropolis and surroundings, the lecturer dealt in detail with the architectural features of the Parthenon and its construction. The Greek revival in architecture took place early in the XIXth century, and as the mind of the public had just then been awakened to the beauty of the Parthenon this naturally led to its being considered worthy of reproduction in whole or in part. The two most celebrated attempts to entirely reproduce the Parthenon were both the desire to give national expression to the deeds of great men. The incomplete Scottish National Monument on the Calton Hill of Edinburgh was the first attempt, and, while the reproduction of a building of a former age was deprecated, yet it was to be hoped that, as the monument had been begun, it would be completed externally according to the original plans, the interior being arranged to suit the purpose to which the building might be put. The other reproduction was the well-known Walhalla, near Regensburg, in Germany, which externally was an almost exact replica of the Parthenon, but internally was one large hall. The lecture was illustrated by a series of lantern slides as well as by drawings and photographs. A vote of thanks brought the meeting to a close.

CONSTITUTION HILL.—Constitution Hill will be thrown open to traffic on Monday next, after having been entirely remade and paved with creosoted Swedish yellow deal. The operations of widening, re-draining, levelling, kerbing, concreting, and wood-paving have been executed by the Improved Wood Pavement Company, Ltd., in fourteen weeks.

THE DOVER PAGEANT.—A pageant is to be organised by Mr. Lewis Parker at Dover from July 27 to August 1, 1908, when a folk play will be enacted in the grounds at Dover College. There are to be 2,000 performers, marshalled as Mr. Parker knows so well how to marshal them, with a "Narrative Chorus of eighty knights of the Table Round," and an orchestra of 100. There is so much English history connected with Dover that a performance of much historical interest may be expected. The booking-office (for seats at 3s. 6d., 5s. 6d., 10s. 6d., and a guinea) will be open on and after February 1, at the Pageant House, 2, Effingham-crescent, Dover.

Legal.

ANCIENT LIGHTS AND THE PRESCRIPTION ACT.

THE case of Heyman *v.* Van Der Bergh and others came before the Court of Appeal, consisting of the Master of the Rolls and Lord Justices Moulton and Farwell on the 15th inst., on the plaintiff's appeal from a judgment of Mr. Justice Parker in the Chancery Division.

In this case the plaintiff, Mrs. Heyman, was the freeholder of a cowshed situated at the rear of certain houses in Harris-street, Camberwell, the shed containing eight windows looking south. The shed was erected in 1877 exactly as it stood in 1906, when the action was commenced, and the access and use of light to its windows had, since 1877, been actually enjoyed without any interruption within the meaning of sect. 3 of the Prescription Act, 1832. In 1898 the cowshed was then in the tenancy of a Mr. Cox, and the defendants, who owned the land and premises on the south side of the shed, instructed their architect to obstruct the windows. It was alleged that Mr. Cox believed that an easement of light had not been acquired in respect of the windows owing to a temporary obstruction of them in the summer of 1896. He, however, removed the new obstruction, and Mr. Wilson, on the instructions of the defendants, was about to re-erect it, when he and Mr. Cox had an interview. At that interview Mr. Wilson, it was said, told Mr. Cox that he must re-erect the obstruction unless he received from Mr. Cox some letter or other document preserving the defendant's rights. On January 18, 1899, Mr. Cox, without reference to the plaintiff, and through his manager, Mr. Barton, wrote to the following effect to Mr. Wilson:—"I will give you 1s. per annum for the use of the eight lights you have boarded up in my cowshed." Mr. Wilson did not acknowledge that letter, but he stamped it as an agreement. Mr. Wilson did not demand payment of the one shilling a year until June 5, 1903, when he wrote to Mr. Cox asking for the arrears to date.

Mr. Cox took no notice of the letter, and never paid the one shilling a year. Just before the action was commenced in July, 1906, the defendants, being desirous of building again, obstructed the windows in question by the erection of hoardings. By the action the plaintiff claimed an injunction to restrain the defendants from building or erecting on their premises adjoining her ancient lights any buildings or obstructions so or in such manner as to interfere with her enjoyment of the access of light to her windows, or so as to cause a nuisance to her. The statement of claim alleged that the free access of light and use of the windows had been enjoyed without interruption for twenty years and upwards prior to the issue of the writ. The defendants denied that the windows were ancient lights, or that the access of light and air had been enjoyed with them for twenty years prior to the issue of the writ, except that the obstruction had temporarily been removed pursuant to Mr. Cox's acknowledgment. Mr. Justice Parker held that in the circumstances the plaintiff had not acquired a right to the access of light to the windows under the Prescription Act, and dismissed the action, hence the present appeal of the plaintiff.

Mr. Buckmaster, K.C., and Mr. Coldridge appeared for the appellant; and Mr. Mark Romer, K.C., and Mr. Martelli for the respondents on the appeal.

Mr. Buckmaster contended the evidence showed that a right to the access and use of the light to the windows of the cowshed had been acquired and never been abandoned. He said that at the end of 1897 a right of light had been acquired which, under the words of sect. 3 of the Act was "absolute" and "indefeasible." The right was given by the statute, and the agreement of January 18, 1899, entered into without the knowledge of the plaintiff as the freeholder, could not take it away. Apart from that the right had already been acquired when the agreement was made, and the evidence showed that Mr. Cox had made the offer in ignorance of the existence of the right. The intention of the Legislature was not that directly a man had got a right of action he should that moment issue a writ to assert that right. He submitted that the "interruption" referred to in the Act must be such an interruption as should come to the knowledge of all persons interested in the property. If a person who had acquired a right gave his assent to an obstruction it might well be that by virtue of sect. 4 of the Act he would be unable after the assent to assert the right he had before the assent was given.

Mr. Coleridge having followed on the same side, their lordships intimated that they would consider whether it would be necessary for them to call upon counsel for the respondents to address the Court.

ALLEGED BREACH OF BUILDING COVENANT.

IN the Chancery Division on the 15th inst., Mr. Justice Parker had before him the case of Lee *v.* Davis on a motion by the plaintiff for an interlocutory injunction to restrain the defendant from building in breach of a covenant.

Mr. Ashworth James, in support of the motion, said the plaintiff and the defendant were the owners of plots of land on a building estate at Knutsford, Cheshire, which had been developed by the Midland Investment Company. Some of the owners of plots of land covenanted to erect houses of an annual value of not less than 100*l.*, and other owners covenanted to erect houses of not less than 50*l.* annual value. The plaintiff and the defendant held plots with the 100*l.* restriction, and the defendant was now seeking to build on his land a house of less than 100*l.* annual value. The defence was that there was not sufficient demand for a 100*l.* house.

Mr. Galbraith said he was willing on behalf of the defendant to give an undertaking not to build any more houses in alleged breach of the covenant pending the trial of the action, but he wished to protect the one that was partially built against the wind and weather. When completed it would be worth 90*l.* a year, and if the action went against him he might add to it so as to comply with the covenant.

His lordship thought the offer a reasonable one, and made no order on the motion except that the costs be costs in the action.

CONTRACTORS' CLAIM FOR 40,000*l.* DAMAGES.

MR. MUIR MACKENZIE, the Official Referee, on the 19th inst. delivered a considered judgment in the case of Jones & Son *v.* the Maesteg Urban District Council, an action by the plaintiffs, a firm of contractors at Neath, against the defendants, to recover damages laid at 40,000*l.* for preventing the plaintiffs from completing a reservoir for supplying the town of Maesteg with water, and which the defendants had employed the plaintiffs to construct for them. (The facts of the case were fully reported in the *Builder* of November 9 last.)

The Official Referee, in giving judgment, said that the sum claimed by the plaintiffs as presented before him at the trial was a sum which was claimed as compensation by way of damages for breaches of a contract for the construction of a reservoir. The defendants denied the alleged breaches, and contended that the contract had been efficiently and lawfully terminated by them in accordance with their legal rights and powers, and that the plaintiffs, as regarded any work done for and materials supplied to the Council had been fully paid, and, indeed, overpaid. The learned Referee then went through the whole of the facts proved before him, and the orders of the Council, under seal, which constituted other contracts entered into by them in respect of the work. He drew attention to the steps which led up to the suspension of the work and the final conclusion of the contract, and he held that the contracts were in all respects legally executed, and were operative to bind the Council as fully as if made by individuals they would have bound them. He said there was nothing which made it physically impossible to carry out the work which plaintiffs undertook to carry out, and the obligations of the parties were in no way conditional on the defendants having, or being able to raise, sufficient money, supposing the nature of the soil increased the work, or on the work when completed being useful and beneficial or worth its cost. The defendant Council had not in the circumstances the right to terminate the contract on the grounds contended before him. He also held that the supplemental contracts regarding the depth of the trench and the procuring of the clay were operative and binding. He then proceeded to discuss the principle on which compensation was payable to the plaintiffs for the breaches of the contract, and he thought the plaintiffs had not been overpaid for the work done by them. Having considered all the items on which damages must be allowed in the light of the plaintiffs' claim and defendants' contentions respecting them, and having dealt with the various heads in detail, he finally awarded the plaintiffs the total sum of 18,909*l.* 3s. 7d. and the costs of the action.

APPORTIONMENT OF NEW STREET EXPENSES.

THE case of Couchman and Stroud *v.* the Lewisham Borough Council came before the Court of Appeal, consisting of Lord Justice Vaughan Williams, the President of the Probate, Divorce, and Admiralty Division, and Mr. Justice Bigham, on the 19th inst., on the appeal of the plaintiffs from a judgment of a Divisional Court of King's Bench composed of the Lord Chief Justice and Justices Ridley and Darling.

Mr. J. B. Matthews said he represented the appellants, Mr. Frederick Stroud and Mrs. Couchman, the tenants in common of some land in the Borough of Lewisham, from the decision of a Divisional Court, who affirmed an order of Mr. Kettle, the Stipendiary, directing the appellants, to pay 137*l.* odd, as their apportioned part of the estimated expenses of forming a new street called Littlewood, in the Borough of Lewisham. Before the Divisional Court he (counsel) raised two points. The first was that the consent of the London County Council had been given for the formation of this new street, but that as the conditions of that consent had not been fulfilled no new street could be made. Although he took that point in the Divisional Court he did not take it now. His other point was that the estimates were for a 40-ft. road, and, upon the facts as found by the learned magistrate, a 40-ft. road could not, in fact, be constructed, as there was not 40 ft. of available space to make a road of that width. In these circumstances the estimated expenses were for something which could not be carried out, and that was the appellant's answer to the case made against them by the Borough Council. He (counsel) would be able to prove that to make the proposed new road of 40 ft. wide the Borough Council would have to encroach on the appellants' land to the extent of 5 ft. For these reasons he said that the apportionment was a bad one.

Mr. Macmorran, K.C. (with him Mr. Courthorpe Munroe), for the respondents, said he did not admit his learned friend's statement that the proposed new road could not be made of a width of 40 ft. without encroaching on the land of the appellants. But his case was that the apportionment would be good though the road could not be made of that width. If the estimate was for too much the Council would have to make a return.

Mr. Justice Bigham said the Lord Chief Justice in the Divisional Court had observed he was not at all satisfied that the road would not ultimately turn out to be a 40-ft. road.

Mr. Matthews contended that if the road could not be made of a width of 40 ft. the respondents ought to proceed to make a fresh estimate of the expenses.

In the result the hearing was adjourned for the purpose of the Borough Council producing certain plans and the Surveyor's books, and also certain plans and documents in the possession of the London County Council.

Capital and Labour.

STATE OF THE BUILDING TRADES.—Employment in October was dull, and somewhat worse than a month ago and a year ago. Returns from 734 firms employing 47,398 workpeople at the end of October show that compared with a month ago there was a decrease of 4·6 per cent., and compared with a year ago a decrease of 5·8 per cent., in the total number of workpeople employed. In London the decrease amounted to 6·5 per cent. compared with September, and 11·5 per cent. compared with October, 1906. In the provinces the decrease was much smaller, amounting to 3·7 per cent. compared with a month ago, and 2·7 per cent. compared with a year ago. The percentage of Trade Union carpenters and joiners unemployed at the end of October was 7·1, as compared with 5·9 a month ago and 7·6 a year ago; and for plumbers, for the same dates, 8·3, 8·0, and 8·0 respectively.—*Labour Gazette.*

Patents of the Week.

APPLICATIONS PUBLISHED.*

12,482A of 1906.—S. KENT: *Water Taps.*

This relates to screw-down cocks and taps which are provided with auxiliary or additional valves operated by the screwing of the tap spindle and with or without springs, and consists in the use of a removable seating for the auxiliary valve.

21,010 of 1906.—E. BRANEM: *Windows.*

This relates to a window of the kind which opens inwardly, and is characterised by a lever carried by a suitable casing of each half of the window and rigidly attached to a plate provided with a tooth which engages in a recess formed in a racket on the window-frame, the arrangement being such that by rotating the lever each half of the window is raised clear of the bead engaging in a groove of its bottom edge and the window is opened inwardly, and that by turning the window back into its original position the window is pressed down and closed.

23,328 of 1906.—J. SOSS: *Bricks or Blocks for Building Purposes.*

This relates to a brick or block with plane end and side surfaces, a bedding surface provided with a series of elevations and depressions, and apertures or bores arranged in the body of the brick.

23,387 of 1906.—C. H. CRAWLEY: *Manufacture of Composite Structures.*

This relates to a process of manufacturing composite structures which are jointed together or completed by casting aluminium or an alloy of the same thereon, and consists in heating the mould to a temperature at which the solder on the wrought members becomes fluid before running in the aluminium or alloy.

25,686 of 1906.—C. SHAW: *Fastenings for Use with Doors.*

This relates to a fastener for use as a combined door chain and stay in which a bar formed of a number of short lengths or links which are joined together in a manner which allows them to turn in one direction in relation to one another, but prevents them from turning substantially out of a straight line with one another in the opposite direction, is carried by the door in a manner which allows it to be slid along the face of the door as the door is closed, and is adapted at its outer end for engagement, when required, with a mounting of the frame, the bar being prevented from being disengaged from such mounting (when engaged) except when the door is closed, when it may be readily disengaged therefrom.

26,545 of 1906.—A. P. FLORENCE: *Domestic Fireplaces.*

This relates to a domestic fireplace, and comprises the combination with the usual fireclay sides of a boiler forming the back of the fireplace, and extending down to the hearth.

26,645 of 1906.—G. T. PIGGOTT and J. B. LE MAITRE: *Fastener for Securing Window Sashes and for Analogous Uses.*

This relates to a fastener for securing window-sashes and the like, having a hooked bolt, and consists in the employment of a pivoted operating lever having a quadrant slot.

27,563 of 1906.—J. WALKER and J. TODD: *Chimney-Pots and Ventilating Terminals.*

This relates to chimney-pots or ventilating terminals wherein a base pot having a series of outer helical ribs is shrouded by a cope, and consists in fitting the said cope with abutments or supports adapted to receive either a completing crown piece or a series of louvre sections.

* All these applications are in the stage in which opposition to the grant of patents upon them can be made.

PATENTS.—*Continued on page* 571.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xviii.; Auction Sales, xxx.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

***** It must be understood that the following paragraphs are printed as news, and not as advertisements: and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur.**

Competitions.

DECEMBER 19.—**Llandrindod Wells.**—RECREATION GROUND AND PAVILION.—The Llandrindod Wells U.D.C. invite competitive schemes for (*a*) laying out the recreation ground and (*b*) erecting a pavilion and other buildings. Full particulars are obtainable from Mr. D. C. Davies, Clerk to the said Council, Llandrindod Wells.

* NO DATE.—**Dudley.**—DAY TRAINING COLLEGE.—The Dudley Education Committee invite designs for a day training college. For further particulars refer to an advertisement in this issue.

NO DATE.—**Enniscorthy.**—MARKET HOUSE BUILDINGS.—The Enniscorthy Urban Technical Instruction Committee are prepared to pay 15*l.* for plans, estimate of specification, for reconstructing Market House Building and adding another story thereto. Mr. P. J. Shaw, Secretary, Enniscorthy.

Contracts.

BUILDING.

NOVEMBER 25.—**Ardsley.**—PLAY-SHED.—Ardsley (E. and W.) District Education Sub-Committee invite tenders for the various works (mason, joiner, slater, and plumber) required in the erection of a play-shed at the Westerton School, West Ardsley. Specifications may be obtained from Mr. Alexander Angus, West Riding Education Office, Northgate, Wakefield.

NOVEMBER 25.—**Billericay.**—SHELTER.—Billericay Guardians invite tenders for the erection of a timber-built shelter, to be erected upon Pound Field, Ongar-road, Brentwood. Plans, etc., can be seen upon appointment with Mr. F. E. Ennals, Shelly-road, Hutton.

NOVEMBER 25.—**Glasgow.**—LAUNDRY.—The Distress Committee of the City of Glasgow invite offers for the erection of a laundry, to include accommodation for washing clothes for, say, about 100 men. Specifications, etc., may be had on application to Mr. J. Paterson, Clerk, Town Clerk's Office, City Chambers, Glasgow.

NOVEMBER 25.—**Portsmouth.**—FIRE-ESCAPE STATION.—Portsmouth Corporation invite tenders for erecting fire-escape station at the corner of North End-avenue and London-avenue. The specifications, etc., may be seen, and a form of tender obtained, at the Borough Engineer's office at the Town Hall.

NOVEMBER 25.—**Southwick.**—ADDITIONS TO TOWN HALL.—Southwick U.D.C. invite tenders for the erection of a small addition to the Town Hall, Southwick. The specification, etc., may be seen, and the general conditions, etc., obtained, from Mr. George Walter Warr, Surveyor to the Council, at the Town Hall, Southwick. The sum of 1*l.* 1s. will be required as a deposit.

NOVEMBER 26.—**Bargoed.**—ALTERATIONS.—Alterations to No. 55, High-street, Bargoed. Plans and specifications can be seen at office of Mr. Wm. Harris, architect and surveyor, Bank-chambers, Bargoed. Quantities may be obtained upon payment of 1*l.* 1s. deposit.

NOVEMBER 26.—**Maud.**—ADDITIONS TO SCHOOL.—For the mason, carpenter, slater, plasterer, plumber, glazier, and painter works of addition to Maud Public School, and for the cabinet fittings for science and manual work-rooms. Plans, etc., may be seen with Mr. James Chalmers. Sealed offers to be lodged with Mr. J. F. Ingram, Clerk to the Board, Old Deer.

NOVEMBER 27.—**Hull.**—SCHOOL ADDITIONS.—Hull Grammar School Committee of the Corporation invite tenders for the necessary work to be performed in the additions to the Grammar School, Leicester-street. Drawings, etc., may be seen at office of Mr Joseph H. Hirst, City Architect, Town Hall, Hull, and quantities obtained, upon a deposit of 2*l.* 2s. Remittances to be made payable to the City Treasurer.

NOVEMBER 29.—**Inverurie.**—SCHOOL.—Inverurie School Board invite offers for the mason, carpenter, plumber, plaster, slater, heating, and painter and glazier works of Higher Grade School at Inverurie. Schedules of quantities, etc., may be obtained from the architect, Mr. Geo. Gray, Inverurie.

NOVEMBER 30.—**Earlestown.**—LIBRARY.—Newton-in-Makerfield U.D.C. invite tenders for erection of new Public Library, Crow-lane, Earlestown, Lancs. Drawings, etc., may be seen at the Town Hall, Earlestown, Lancs. Copy of the bills of quantities and form of tender may be obtained from the Clerk to the Council, upon payment of 2*l.* 2s.

* NOVEMBER 30.—**Edinburgh.**—FINE ART BUILDING.—The Scottish National Exhibition Committee invite tenders for the fine art building at Saughton Park for the exhibition of 1908. For further particulars refer to an advertisement in this issue.

DECEMBER 2.—**Parkstone.**—SHOPS, ETC.—The erection of three shops with residences, etc., in Bournemouth-road, Parkstone, for Mr. John J. Norton. Plans, etc., can be inspected at the offices of the architects, Messrs. Smart & Wyeth, Bank-chambers, 220, Ashley-road, Parkstone.

DECEMBER 3.—**Dundrum, Dublin.**—ASYLUM BLOCK.—The Board of Public Works invite tenders for building a new refractory block at the Central Criminal Lunatic Asylum, Dundrum, Co. Dublin. The plans and specification can be seen at office of Mr. H. Williams, Secretary, Office of Public Works, Dublin. Forms, etc., will be supplied on deposit of 1*l.*

DECEMBER 3.—**St. Mellion.**—ORGAN CHAMBER, ETC.—For building an organ chamber and vestry, etc., at St. Mellion Church, under the direction and according to plans, etc., of Mr. E. Sedding, architect. Full particulars can be obtained from Rev. F. Wintle, St. Mellion Rectory, E. Cornwall.

DECEMBER 4.—**Dartford.**—PUMP-HOUSE.—The U.D.C. of Dartford invite tenders for the construction of pump-house, storage tank, etc., off Victoria-road, Dartford. Plan and specification may be seen at the office of the Surveyor, Mr. T. E. Tiffin, Council Offices, Dartford.

DECEMBER 4.—**Dublin.**—ALTERATIONS.—The Board of Public Works invite tenders for additions and alterations to the schoolmaster's block at the Royal Hibernian Military School, Phœnix Park, Dublin. The plans, etc., can be seen at office of Mr. H. Williams, Secretary, Office of Public Works, Dublin. Forms of tender, etc., will be supplied on deposit of 1*l.*

DECEMBER 4.—**Llanddaniel.**—CHAPEL.—The erection of C.M. Chapel at Llanddaniel, Anglesea. Plans, etc., to be seen at Mr. R. G. Owen, Carregddyfnallt, Llanddaniel, and at the office of Messrs. Richard Davies & Son, architects, Bangor.

DECEMBER 5.—**Llanddona.**—SCHOOL ALTERATIONS.—Certain additions and alterations to the Council school, Llanddona, for the Anglesey Education Committee. Plans, etc., may be inspected at the School House, and at office of Mr. Jos. Owen, F.R.I.B.A., County Architect, Menai Bridge.

DECEMBER 6.—**Fartown.**—CLUB.—The erection of a Liberal Club in Cobcroft-road, Fartown. Plans, etc., may be seen, and quantities obtained, at offices of Messrs. Stocks & Sykes, architects, St. Peter's-street, Huddersfield.

DECEMBER 6.—**Ilkley.**—SCHOOL.—The West Riding Education Committee invite tenders in connexion with the erection of a new school at Ben Rhydding, Ilkley. Plans may be seen, and bills of quantities obtained, on application to office of Mr. J. Vickers-Edwards, County Architect, County Hall, Wakefield. A deposit of 1*l.* is required. Cheques, etc., must be made payable to the West Riding Treasurer, and sent to him direct at the County Hall, Wakefield.

DECEMBER 7.—**Bradford.**—DRYING-CLOSETS.—Bradford Guardians invite tenders for alterations to drying-closets at the Union Hospital Laundry, Bradford. Name and address, along with 1*l.* 1s., to Mr. Fred Holland, Engineer and Architect, 11, Parkinson's-chambers, Hustlergate, Bradford.

DECEMBER 7.—**Connor Downs.**—SCHOOL.—Cornwall Education Committee invite tenders for Council School at Connor Downs, according to plans, etc., which may be seen, by appointment, at the office of Mr. Sampson Hill, Architect to the Committee, Green-lane, Redruth, from whom all particulars, etc., may be obtained.

DECEMBER 7.—**Dyffryn, Goodwick.**—HOUSES.—The erection of forty houses at Dyffryn, Goodwick, in the county of Pembroke. Plans, etc., may be seen at the office of Mr. Vincent Johns, solicitor, Fish-guard, and also at the office of the architect, Mr. Hugh Thomas, 9, Victoria-place, Haverfordwest.

DECEMBER 9.—**Belfast.**—COTTAGE.—Great Northern Railway Company (Ireland) Directors invite tenders for the erection of one single-story cottage in brick-work, at Belfast. Drawing, etc., can be seen at the office of Mr. W. H. Mills, Engineer-in-Chief, Amiens-street Terminus, Dublin, or copies of same at the District Engineer's office, Belfast, and forms can be had on payment of 2s. each (not returnable).

* DECEMBER 9.—**Birmingham.**—COUNCIL-HOUSE EXTENSION.—The Corporation of Birmingham invite tenders for the excavations, foundations, and erection of the lower ground floor of the buildings in extension of the Council-house. For further par-

* DECEMBER 9.—**Sutton Coldfield.**—SCHOOL.—Tenders are invited for the erection of a school for 120 children in Hollyfield-road, Sutton Coldfield. For further particulars see advertisement in this issue.

DECEMBER 11.—**Kempton Park.**—COAL BAYS, ETC.—The Metropolitan Water Board invite tenders for the construction of coal bays, fitting and other workshops, stores, tool-houses, conveniences, and other works to be erected at Kempton Park. Forms of tender, etc., may be obtained, and the drawings inspected, on application to the Engineer of the Staines Reservoirs Communication Works, "The Firs," Southern-road, Fortis Green, Finchley, N., on production of an official receipt for the sum of 5*l.*, which sum must be first deposited with the Comptroller at the Board's Central Offices, Savoy-court, Strand, W.C.

* DECEMBER 11.—**Scarborough.**—POST-OFFICE.—The Commissioners of H.M. Works and Public Buildings invite tenders for the erection of a new post-office at Scarborough. For further particulars see advertisement in this issue.

DECEMBER 12.—**Sutton Coldfield.**—SCHOOL ENLARGEMENT.—Sutton Coldfield Corporation invite tenders for the enlargements of the Boldmere and Hill Girls' Schools. Plans, etc., may be seen, and forms of tender obtained, on application to Mr. W. A. H. Clarry, Borough Surveyor, The Council House, Sutton Coldfield.

NO DATE.—**Balerno.**—PRESBYTERY HOUSE.—For mason, joiner, slater, plumber, and plaster works of new Presbytery House at Balerno. Schedules of quantities can be had from M'Luckie & Walker, architects, Stirling.

NO DATE.—**Hanley.**—MISSION-HALL.—For erection of mission-hall, etc., Bucknall Old-road, Hanley, for the Bethesda Mission Trustees. Mr. Wm. Campbell, architect, Hanley.

NO DATE.—**Harrogate.**—ADDITIONS TO HOTEL.—The erection of the proposed alterations and additions to the Dirlton Private Hotel, Ripon-road, Harrogate, for Mr. J. W. Rymer. Names to Mr. John Whitehead, architect, Herald-buildings, Harrogate.

NO DATE.—**Llantrisant.**—EXTENSION OF WORKS.—Extensions to engineering works for Messrs. Mountford Phillips & Co, Ltd., Pontyclun, Llantrisant. Names to Mr. W. B. Jones & Peregrine, architects and Surveyors, Bank-chambers, Station-road, Port Talbot.

* NO DATE.—**Maidenhead.**—RESIDENCES.—Tenders are invited for one or two private residences at Maidenhead Court. For further particulars refer to an advertisement in this issue.

* NO DATE.—**Portsmouth.**—BARRACK BLOCK, ETC.—The War Department invite tenders for works proposed in new R.A.M.C. barrack block and alterations to existing cook-house and bath-rooms, etc., at the Alexandra Hospital, Cosham, near Portsmouth. For further particulars refer to an advertisement in this issue.

* NO DATE.————.—WORKS AND REPAIRS.—The Secretary of State for War invites tenders for works and repairs to military buildings in the United Kingdom (including painting). For further particulars refer to an advertisement in this issue.

ENGINEERING, IRON, AND STEEL.

NOVEMBER 29.—**London.**—RAILS, ETC.—The Crown Agents for the Colonies, acting on behalf of the Government of Southern Nigeria, invite tenders for the supply of (*a*) 5,373 tons 55-lb. F.B. British Standard steel rails and fishplates; (*b*) 118,716 steel sleepers for above with keys; (*c*) 8,840 tons 45-lb. F.B. British Standard steel rails and fishplates; (*d*) 239,760 steel sleepers for above with keys. Forms of tender, etc., may be obtained on application at the office of the Crown Agents for the Colonies, Whitehall-gardens, London, S.W., on payment of a deposit of 1*l.* for each specification.

NOVEMBER 29.—**Rawtenstall.**—ELECTRICITY SUPPLY.—Part 1.—Lighting cables, conduits, trenching, etc. Part 2.—Tramway cables, conduits, trenching, etc. Copies of the general conditions, etc., may be seen at the offices of the engineers, Messrs. Lacey, Sillar, & Leigh, 2, Queen Anne's-site, Westminster, and 78, King-street, Manchester, and may be obtained from the former office only, on payment of a deposit of 3*l.* 3s.

NOVEMBER 30.—**St. Annes-on-the-Sea.**—BAND-STAND.—The U.D.C. invite tenders for the supply of an ornamental iron bandstand of 26 ft. or 27 ft. diameter. Mr. Thos. Bradley, Clerk, Council Offices, St. Annes-on-the-Sea.

DECEMBER 4.—**Ventnor.**—GROYNE.—Ventnor U.D.C. invite tenders for certain works in connexion with the reconstruction and strengthening of a timber groyne on the eastern shore at Ventnor. Detailed specification and plans may be inspected at the office of the Town Surveyor, Town Hall, Ventnor.

DECEMBER 9.—**Dover.**—WATER MAINS.—Dover T.C. invite tenders for the laying of a water main from Folkestone-road to Priory-hill. Forms of tender, etc., may be obtained on payment of 2*l.* 2s., and conditions and drawings inspected, at the office of the Borough Engineer, Mr. W. C. Hawke, A.M.Inst.C.E., Maison Dieu House, Biggin-street, Dover.

* DECEMBER 11.—**Bury.**—HEATING SCHOOLS.—The Bury Corporation invite tenders for heating proposed Council schools, Pine-street, Bury, with or without ventilation. For further particulars see advertisement in this issue.

DECEMBER 11.—**Kempton Park.**—SAND-WASHING APPARATUS.—The Metropolitan Water Board invite tenders for the construction of lines of rails, drain channels, pipe connexions, etc., for sand-washing apparatus at Kempton Park. Forms of tender, etc., may be obtained, and the drawings inspected, on application to the Engineer of the Staines Reservoirs Communication Works, "The Firs," Southern-road, Fortis Green, Finchley, N., on production of an official receipt for the sum of 2*l.*, which sum must be first deposited with the Comptroller at the Board's Central Offices, Savoy-court, Strand, W.C.

DECEMBER 12.—**Gillingham.**—REFUSE DESTRUCTOR.—Tenders are invited for the erection of plant capable of effectually burning a minimum of 30 tons of refuse per day of sixteen hours. Full particulars, etc., may be obtained from Mr. J. L. Redfern, Borough Surveyor, on payment of a deposit of 2*l.* 2s.

✱ DECEMBER 24.—**Strood.**—COVERED SERVICE RESERVOIR.—The Rochester Corporation invite tenders for a covered service reservoir (in concrete) at Broom Hill, Strood. For further particulars refer to an advertisement in this issue.

MISCELLANEOUS.

NOVEMBER 25.—**London.**—TIRES.—The Bengal and North-Western Railway Company Directors invite tenders for the supply and delivery of 2000 carriage and wagon tires, as per specification to be seen at the Company's offices, 237, Gresham-house, Old Broad-street, London, E.C. For each specification a fee of 10s. will be charged, which cannot under any circumstances be returned.

NOVEMBER 25.—**Stone.**—SCAVENGING.—Stone R.D.C. (Handford Special Drainage District) invite tenders for the removal of house refuse from premises, and for the cleansing of earth-closets, privies, ashpits, and cesspools within the Hanford Special Drainage District. Mr. J. Buckley Norris, Clerk, 21, High-street, Stone.

NOVEMBER 25.—**Surbiton.**—WATER-VANS, ETC.—The U.D.C. of Surbiton invite tenders for repairing their water-vans and carts. Specifications of the work to be done, and form of tender, can be obtained on application to Mr. Henry T. Mather, Surveyor, Council Offices, Surbiton.

NOVEMBER 26.—**Alfreton.**—SCAVENGING.—Alfreton U.D.C. invite tenders for scavenging. Conditions and forms of tenders, etc., may also be obtained on application to Mr. J. Spencer, Sanitary Inspector, Council Offices, Alfreton.

NOVEMBER 26.—**Caerphilly.**—LIGHTING MATERIALS.—Caerphilly U.D.C. invite tenders for the supply of tin oil receptacles, globes, and wick, as required, for the public oil lamps in their district. Specification can be seen, and form of tender obtained, from Mr. A. O. Harpur, Surveyor, Council Offices, Caerphilly.

NOVEMBER 27.—**Guernsey.**—CARTAGE.—The Public Thoroughfares Committee invite tenders for carting in the several parishes of the island for three years. Forms of tender may be obtained from Mr. Fred. G. Maxted, States Road Engineer, Public Works Department, States Office, Guernsey.

NOVEMBER 27.—**Lydd.**—STEAM ROLLING, ETC.—Lydd Corporation invite tenders for steam rolling and scarifying at per hour. Mr. Thomas Kettle, Borough Surveyor.

NOVEMBER 27.—**Scarborough.**—FENCING.—Scarborough T.C. invite tenders for the provision and erection of about 840 yds. of wrought-iron unclimbable fencing, entrance gates, etc. Plans may be seen, and form of tender, etc., obtained, on application at the Borough Engineer's Office, Town Hall, St. Nicholas-street. Deposit of 1*l.* 1s. required.

✱ NOVEMBER 27.—**Wood Green.**—IRON FENCING.—The Wood Green U.D.C. invite tenders for a quantity of wrought-iron unclimbable iron fencing. For further particulars refer to an advertisement in this issue.

DECEMBER 2.—**Bishop's Waltham.**—GUTTER WORK.—The R.D.C. of Droxford invite tenders for work in connexion with the covering in of a gutter, about 73 yds. in length, in Houchin-street, Bishop's Waltham. Specifications may be seen at office of Mr. H. Godfrey Pearson, Clerk of the Droxford R.D.C., Bishop's Waltham, Hants.

DECEMBER 3.—**Malling.**—SCAVENGING.—Malling R.D.C. invite tenders for scavenging. Full particulars, etc., can be obtained upon application to Mr. C. Souter, Inspector of Nuisances, West Malling.

DECEMBER 5.—**Birkenhead.**—DEMOLITION OF PROPERTY.—The Committee invite tenders for the taking down of the premises numbered 1 to 5, Hemingford-terrace, Conway-street, Birkenhead, of which full particulars may be obtained from the architect, Mr. T. Faliesin Rees, F.R.I.B.A., of 31, Hamilton-street, Birkenhead.

DECEMBER 7.—**Worcester.**—HAULING.—Worcester Corporation invite tenders for the hire of horses, carts, and drivers, for hauling materials. Forms of tender may be obtained at the office of Mr. T. Caink, A.M.Inst.C.E., City Engineer, Guildhall, Worcester.

DECEMBER 9.—**Glasgow.**—GAS STOVES.—Glasgow Corporation invite tenders for the supply of gas stoves and grillers. Particulars may be had on application to Mr. Alexander Wilson, Gas Engineer, 45, John-street, Glasgow.

DECEMBER 9.—**Snodland.**—SCAVENGING.—Snodland P.C. invite tenders for the dry scavenging, *i.e.*, house refuse of the parish. Particulars can be obtained on application at office of Mr. Tom Hilder, Clerk to the Council, Pelham House, Snodland.

DECEMBER 11.—**South Shields.**—DISINFECTANTS.—South Shields Corporation invite tenders for the supply of disinfectants for a period of one year. Forms of tender and other information may be obtained from Dr. Mostyn, Health Office, Russell-street, South Shields.

NO DATE.—**Tredegar.**—TAKING DOWN.—For taking down brick chimney stack, 170 ft. high, at Tredegar. For further particulars apply to the Whitehead Iron and Steel Company, Ltd., Tredegar.

PAINTING, etc.

NOVEMBER 25.—**Gorgie.**—GLAZING.—Patent glazing of roofs in connexion with Cattle Market at Gorgie. Plans, etc., may be seen at the Public Works Office, City Chambers, Edinburgh.

NOVEMBER 25.—**Harrogate.**—PAINTING.—Harrogate Corporation invite tenders for painting the public seats in various parts of the Borough. The specification may be seen at office of Mr. F. Bagshaw, Borough Engineer and Surveyor.

NOVEMBER 26.—**Hull.**—PAINTING.—Hull Corporation invite tenders for painting certain property. Forms of tender and other particulars may be obtained at the City Engineer's Office.

NOVEMBER 28.—**Cork.**—PAINTING.—The Guardians invite tenders for:—(1) Painting, (2) plumbing works, and (3) repairing roofs and providing grates, etc., at Shandon-street Dispensary, according to specifications, which may be inspected in the board-room, Workhouse.

DECEMBER 2.—**Halifax.**—PAINTING.—Halifax Market Committee invite tenders for painting the interior of the Borough Markets. Specifications may be seen, and forms of tender obtained, on application to Mr. James Lord, M.Inst.C.E., Borough Engineer, Town Hall, Halifax, upon payment of the sum of 1*l.*

ROADS, SANITARY, AND WATER WORKS.

NOVEMBER 25.—**Edinburgh.**—PAVING, ETC.—Edinburgh Magistrates and Council invite tenders for the demolition of old properties in Simpson's-court, Greenside, and for paving court surfaces, conform to plans, etc., prepared by the Burgh Engineer, from whom schedules of quantities and all particulars may be obtained.

NOVEMBER 25.—**Harrogate.**—STREET WORKS.—The Harrogate Corporation invite tenders for the private street works required in Dragon-avenue and back road at rear of Beechwood-crescent. The specification may be seen, and quantities obtained, at office of Mr. F. Bagshaw, Borough Engineer and Surveyor.

NOVEMBER 25.—**Penarth.**—STREET WORKS.—Penarth U.D.C. invite tenders for private improvement (street) works in Earl-road. Plan, etc., may be seen, and bills of quantities obtained, at the Surveyor's office, Council Offices, Penarth.

NOVEMBER 26.—**Ilford.**—ROAD WORKS.—Ilford U.D.C. invite tenders for levelling, metalling, flagging, lighting, and making good Mafeking-avenue, Cecil, Howard, and Madras roads. Plans, etc., may be seen, and forms of tender obtained (on payment of a deposit of 2*l.* 2s.), upon application to Mr. H. Shaw, M.Inst.C.E., Engineer and Surveyor to the Council, at the Town Hall, Ilford.

NOVEMBER 27.—**Birmingham.**—SEWERAGE WORKS.—Birmingham Public Works Committee invite tenders for the construction of brick storm-water culverts and pipe sewers in Monument-road, Noel-road, Harold-road, Waterworks-road, Somerville-road extension, Portland-road, and on private land adjoining Portland-road; together with Bellmouth Junction, manholes, and other incidental works. Plans, etc., may be seen, and quantities obtained, at the offices of Mr. Henry E. Stilgoe, M.Inst.C.E., City Engineer and Surveyor, The Council House, Birmingham, on deposit of the sum of 2*l.*

NOVEMBER 27.—**Bognor.**—GRANITE KERB, ETC.—Bognor U.D.C. invite tenders for the supply of 1,520 ft run of 12-in. by 6-in. flat Norwegian granite kerb and 72 ft. run of circular ditto (6-ft. radius); also for laying 1,132 yds. super. of 2½-in. limestone tar paving, to be laid on prepared paths in Essex-road, Bognor. Mr. Henry Layton Staffurth, Clerk, Council Offices, Bognor.

NOVEMBER 27.—**Littlehampton.**—CEMETERY EXTENSION.—Littlehampton U.D.C. invite tenders for sundry works of taking down and refixing oak fencing, formation of paths, and building gully pits in connexion with extension of cemetery grounds. Drawings, etc., can be seen, and form of tender obtained, on application to the Council's Surveyor, Mr. H. Howard, F.S.I., Town Offices.

NOVEMBER 28.—**Friern Barnet.**—ROADMAKING.—Friern Barnet U.D.C. invite tenders for kerbing, channelling, making-up, etc., of Stanley-road, Crown-road, and part of Hampden-road. Forms of tender, etc., can be obtained from Mr. E. J. Reynolds, A.M.Inst.C.E., the Council's Engineer and Surveyor.

NOVEMBER 29.—**Gravesend.**—MAKING-UP.—The T.C. invite tenders for making-up Portland-avenue. Plan, etc., may be seen at the Borough Surveyor's Office, Town Hall, Gravesend.

NOVEMBER 30.—**Gorton.**—STREET WORKS.—Gorton U.D.C. Highways Committee invite tenders for sewering, paving, flagging, and making good Corporation-street. Plans may be seen, and specifications, etc., obtained, from the Surveyor, Town Hall, Gorton, on payment of 2*l.* 2s.

DECEMBER 3.—**Ealing.**—PRIVATE STREET IMPROVEMENTS.—Ealing T.C. invite tenders for the making-up of roads. The drawings and specifications may be seen, and form of tender, etc., obtained, from Mr. Charles Jones, M.Inst.C.E., Borough Engineer, Town Hall, Ealing, W., upon payment of a deposit of 10s. 6d. for each road.

DECEMBER 3.—**New Sarum.**—PRIVATE IMPROVEMENT WORKS.—The T.C. invite tenders for executing certain works of levelling, paving, metalling, flagging, channelling, making good, etc., that portion of the road or street known as Churchfields-road, from the old borough boundary to the end of Spring Villas. Drawings, etc., can be seen at the office of the City Surveyor, Endless-street.

DECEMBER 4.—**Middleton.**—MAKING-UP.—The Corporation of Middleton invite tenders for the making-up of the passage behind Church-road, Middleton Junction. Plans may be seen, and specifications, etc., obtained, on payment of 10s. 6d., on application to Mr. W. Welburn, Borough Surveyor, at his office, Town Hall, Middleton, between the hours of 9.30 and 10.30 a.m.

DECEMBER 7.—**Loughton.**—SEWAGE WORKS.—Loughton U.D.C. invite tenders for the erection of a continuous bacterial filter. Plans, etc., can be obtained from Mr. Horace White, District Surveyor and Engineer to the Council, upon payment of a deposit of 1*l.* for plans, etc.

DECEMBER 9.—**Stirling.**—WATER MAIN.—The carting, laying, and jointing of a 15-in. cast-iron water main for the Water Commissioners of the Burgh of Stirling. Plans, etc., will be seen, and copies of specifications of works and schedules of quantities obtained, at the office of Mr. And. H. Goudie, Water Engineer, Stirling, on payment of the sum of 1*l.*

✱ DECEMBER 9.—**Wandsworth.**—MAKING-UP AND PAVING.—The Wandsworth B.C. invite tenders for making-up and paving part of Burntwood-lane, Springfield. For further particulars refer to an advertisement in this issue.

DECEMBER 20.—**Leeds.**—RESERVOIR.—The Waterworks Committee of the Leeds City Council invite tenders for the construction of a watertight reservoir, etc., to be known as the Leighton Reservoir, situate on the Pott Beck, in the Urban District of Masham, and about five miles west of Masham Station, on the North-Eastern Railway. Plans may be seen, and forms of tender, etc., obtained, on application at the office of Mr. C. G. Henzell, Waterworks Engineer, Leeds, on payment of 10/.

✱ NO DATE.—**Hants.**—NEW ROADS, ETC.—The War Department invite tenders for works proposed in forming new roads and completing parades and drainage at Bordon Barracks, Hants. For further particulars refer to an advertisement in this issue.

STONE, MATERIALS, AND STORES.

NOVEMBER 25.—**Birmingham.**—STORES.—Cadbury Brothers, Ltd., Bourneville, Birmingham, invite tenders for contracts for 1908. Specification will be sent on application.

NOVEMBER 25.—**Croydon.**—GRANITE.—Croydon Guardians invite tenders for the supply of 2,000 tons of unbroken Guernsey granite. Forms of tender to be obtained of Mr. Harry List, Clerk to the Guardians, Union Offices, Thornton Heath.

NOVEMBER 25.—**Handsworth.**—MATERIALS.—The U.D.C. of Handsworth invite tenders for supplying goods and materials. Conditions of contract and specification may be seen, and forms of tender obtained, on application to the Surveyor, at the Council House, Handsworth.

NOVEMBER 25.—**Waterloo-with-Seaforth.**—SEWER PIPES.—The U.D.C. of Waterloo-with-Seaforth invite tenders for about 550 yds. of stoneware sewer pipes, 2-ft. diameter, with Stanford joints. Specification, etc., may be obtained on application to Mr. F. Spencer Yates, A.M.Inst.C.E., the Surveyor to the Council, at the Town Hall, Waterloo.

NOVEMBER 26.—**Caerphilly.**—LIGHTING MATERIAL.—Caerphilly U.D.C. invite tenders for the supply of tin oil receptacles, globes, and wick, as required, for the public oil lamps in their district. Specification can be seen, and form of tender obtained, from Mr. A. O. Harpur, Surveyor, Council Offices, Caerphilly.

NOVEMBER 26.—**Edmonton.**—DEAL, ETC.—Edmonton Guardians invite tenders for the supply of 100 fathoms of best yellow Baltic deal and batten ends, to be delivered at the Edmonton Workhouse. Mr. F. Shelton, Clerk, Lower Tottenham.

NOVEMBER 26.—**London.**—STORES.—The South Indian Railway Company, Ltd., invite tenders for the supply of:—(1) General stores; (2) locomotive stores; (4) iron wire fencing. Specifications, etc., may be obtained at the Company's offices, 55, Gracechurch-street, London. A charge, which will not be returned, will be made of 20s. for each copy of the specification No. 1 and of 10s. for each copy of Nos. 2 and 4. Copies of the drawings may be obtained at the office of Sir George B. Bruce, 3, Victoria-street, Westminster, on payment of 5s. per sheet.

NOVEMBER 26.—**London.**—PIG IRON.—Bombay, Baroda, and Central India Railway Directors invite tenders for the supply of pig iron. Forms, etc., can be obtained at offices of Mr. W. V. Constable, Secretary, Gloucester House, 2, 3, and 4, Bishopsgate-street Without, London, E.C., on payment of 21s. (which will not be returned).

NOVEMBER 27.—**Warwickshire.**—MAIN ROAD MATERIAL.—Warwickshire C.C. invite tenders for the supply of road material (broken or unbroken). Forms to be obtained from the County Surveyor.

NOVEMBER 30.—**Farnborough.**—MATERIALS.—Farnborough U.D.C. invite tenders for the supply of stoneware pipes of various sizes; picks, shovels, tools, castings, and sundry plant. Specifications, etc., may be obtained upon application to Mr. J. E. Hargreaves, Surveyor.

NOVEMBER 30.—**Glasgow.**—STORES.—The Directors of Messrs. G. & J. Burns, Ltd., invite tenders for the supply of stores. Printed forms of tender may be had on application at office of Mr. A. M. Kay, Secretary, 30, Jamaica-street, Glasgow.

DECEMBER 2.—**Hanwell.**—MATERIALS.—Hanwell D.C. invite tenders for materials. Full particulars and quantities can be obtained at the Council Offices.

DECEMBER 2.—**Worcester.**—MATERIALS.—Worcester Corporation invite tenders for the supply of materials during the years 1908 and 1909. Forms of tender, etc., can be obtained from the City Engineer's Office, Guildhall, Worcester.

DECEMBER 3.—**Wombwell.**—MATERIALS.—Wombwell U.D.C. invite tenders for the supply of road materials. Further particulars, etc., may be obtained from the office of the Surveyor to the Council, Mr. J. W. Harrison.

DECEMBER 4.—**Dublin.**—STORES.—The Directors of the City of Dublin Steam Packet Company invite tenders for the supply of brass and copper work, iron castings, paints, timber, etc. Specifications can be seen at the company's Office, 9, Regent-road, Liverpool.

DECEMBER 4.—**London.**—STORES.—Great Western Railway Directors invite tenders for the supply of stores for use at the Avon Colliery, Abergwynfi, South Wales. Forms of tender may be obtained on application to Mr. G. K. Mills, Secretary, Paddington Station, London.

DECEMBER 7.—**Sunderland.**—STORES.—The Sunderland R.D.C. invite tenders for works and materials in their district for one year. Drawings and patterns, etc., may be seen on application to the Surveyor. Forms of tender may be obtained on application to Mr. J.C. Wilson, Clerk to the Council; offices, 17, John-street, Sunderland.

DECEMBER 9.—**South Hetton.**—STORES.—The South Hetton Coal Company, Ltd., invite tenders for next year's supply of iron, castings, wire rope, oils, and other colliery stores, except timber. Forms of tender, etc., may be obtained from Mr. J. R. Lambert, South Hetton, Sunderland.

DECEMBER 9.—**Trimdon Grange.**—STORES.—For supply of iron, castings, wire ropes, oils, explosives, electric fittings, and colliery stores, except timber. Forms of tender, etc., may be obtained from the Storekeeper, Trimdon Grange Colliery.

DECEMBER 11.—**Dublin.**—CORDAGE.—The Dublin Port and Docks Board invite proposals to supply cordage. Forms of proposal may be had at office of Mr. N. Proud, Secretary, Port and Docks Office, Westmoreland-street, Dublin.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*CLERK OF WORKS	Twickenham U.D.C.	3l. 3s. per week	Dec. 4
*VISITING TEACHER (LD. SURVEYING AND LEVELLING)	London County Council	See advertisement in this issue	do.

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*CONTRACTOR'S PLANT AND MATERIAL, BECKTON—On the Premises	Fuller, Horsey, Sons, & Cassell	Nov. 26
*DEALS, BATTENS, ETC.—Great Hall, Winchester House, Old Broad-street, E.C.	Churchill & Sims	Nov. 27
*FREEHOLD BUILDING SITE, NEAR OXFORD-CIRCUS—At the Mart	Southon & Robinson	Nov. 29
*FREEHOLD PROPERTY, CARDIFF—Old Town Hall, Cardiff	Douglas Young & Co.	Dec. 5

PATENTS.—*Continued from page 568.*

28,279 of 1906.—G. T. MONEY: *Hinge or Joint for Doors, Screens, or other Uses.*

This relates to a hinge which is sight and draught-proof, constructed of sectional cylindrical pieces, which are fixed alternately to the uprights of adjacent frames or the like.

28,878 of 1906.—H. STANTON and A. W. STANTON: *System of Reinforced Concrete Flooring for Buildings.*

This consists in the use of metal bars or slates, preferably of the description known as hoop, and of steel, arranged in pairs, and with ends shaped to connect or link the horizontal and sloping bars together, such connexion being made at or near the bearing or support of the floor by turning down the sloping to the horizontal bar, or *vice versâ*, then bending horizontally under then vertically, and again horizontally over.

122 of 1907.—THE LEEDS FIRECLAY COMPANY, LTD., and E. F. REYNOLDS: *Means for Securing a Good Connexion between the "Down Pipe" and the "Inlet" of Closets and the like.*

This relates to means for connecting the "down pipe" with the inlet "pipe" of a water-closet basin, slop sink, or the like, and comprises the combination of a tubular body fitting the exterior of the "down pipe" and having an outwardly projecting flange to fit within the inlet socket and bear against the inner end thereof, an inwardly projecting flange acting as a stop for the "down pipe," and a short tube, or spigot, which is an easy fit, within the "inlet" opening.

2,181 of 1907.—C. MENZIES: *Boilers for Cooking Ranges and the like.*

This relates to a range boiler, consisting of sheets of tubes arranged upon either side of a partition (which may be in the form of an additional boiler)—at the rear of the fire-grate, the gases being constrained to pass downwards over one sheet, beneath the partition, and upwards over the other sheet.

3,265 of 1907.—W. ELLIS: *Water-closet Seats and their Hinges.*

This relates to a water-closet seat having an unbroken surface at its rear or hinge part, its hinge being formed by eye-bolts taking in recesses cut in the under side of the seat, and by a pin passing right through the rear part of the seat.

4,521 of 1907.—C. G. WOODHOUSE: *Construction of Entrenching Tools.*

This relates to an entrenching tool comprising two separable members, of which the first, which forms the handle, is tubular, and has secured to it at one end a hollow T head of short length, which forms a socket for the secure attachment thereto of the second member, which constitutes the tool proper, which makes contact with the substance to be operated on, the construction being such that a part of the length of the second member is of such transverse dimensions as to pass through the socket head of the first member in a direction approximately at right angles to the tubular handle, the outer profile of the section of this portion of the second member and the inner profile of the section of the socket of the first member being such that after insertion the second member can be angularly displaced about its axis relatively to the first member, and in the displaced position be prevented from longitudinal movement, means being provided for temporarily locking the members in the angularly displaced position.

7,958 of 1907.—O. DOERING: *Couplings for the Flush-pipe of Water-closets.*

This relates to joints or connexions between the flush-pipe and closet arm, and consists in the use of a conical elastic tightening thimble open at both ends, having a cuff inside of the outlet end, and a collar at its back side.

7,992 of 1907.—G. E. NYE and G. A. KREIS: *Interlocking Metal Sheet Piling.*

This relates to interlocking metal sheet piling in which the channel bars of which the units are composed are provided inwardly of their flanges and parallel therewith with guide ribs of less depth than said flanges integral with the web and disposed on the inner face of the latter, said channel bars being coupled to form hollow units having longitudinal slots in their side edges in which that portion of an adjacent channel bar lying between a flange and rib thereof is received, the flange of said adjacent channel bar being received in said hollow unit and having its free end lying between a rib and flange of said hollow unit so that the channel bars are held against side movement.

9,640 of 1907.—W. SHORT: *Door Wedges.*

This relates to a door wedge formed hollow and with its upper surface inclined from the base of a knife edge in front, and having a tooth upon its under side extending rearwards from the knife edge to grip the door, and projections upon the upper surface for gripping the door upon any attempt being made to open the door when the wedge is in position.

12,375 of 1907.—SUB-TARGET GUN COMPANY: *Tools or Implements for Intrenching or Digging, and other purposes.*

This relates to an implement for use in the field, and comprises the combination with a handle of a blade or pulley adjustably attached so as to be locked in any one of a plurality of positions upon said handle, and having means to prevent the accumulation of dirt between the interlocking parts.

12,520 of 1907.—J. H. MCCOY: *Apparatus for Building Hollow Concrete Structures.*

This relates to an apparatus for building hollow concrete structures, and comprises the combination with an upper framework having radial arms, and means for suspending the framework at the centre, of an inner and outer shell, supporting devices connecting the shells with the radial arms of the framework, and means for independently adjusting the inner and outer shells to varying diameters.

13,625 of 1907.—T. W. TWYFORD: *Water-closet Basins.*

This relates to a pedestal water-closet in which a siphon is self-contained in the pedestal itself and extends from the bottom of the pan to an outlet passage directly underneath the said pan, and consists in forming or arranging, within the pedestal and at the bottom of the longer leg of the siphon, a cavity or receptacle for intercepting and retaining a reserve of water after every flush, and choking or contracting the outlet passage so as to admit of the intercepted or reserve water being utilised for forming a momentary seal, and for displacing or rarefying air within the siphon passages at the commencement of the discharge of the pan.

14,092 of 1907.—P. WERNICKE: *Moulding Presses.*

This relates to a moulding press with an intermittently rotating mould table and downwardly acting die, and consists of means for supporting the mould bottoms comprising a toggle joint located below the table and acted on by gravity so that the toggle joint is normally nearly straight, in which position it affords to the mould bottom above it a support which is capable of withstanding the maximum admissible moulding pressure, but yields to pressure exceeding said maximum, said toggle joint being so connected to the mechanism of the press that flexion is automatically imparted to the joint prior to each movement of the table, the upper end of the joint being by this means removed from the path of the moulding plate.

19,258 of 1907.—L. S. BACON: *Weather Excluders and the like.*

This consists of a thin sheet metal weather strip having a base part and a rib part extending outwardly at an angle to the base, the outer edge of the rib part being provided with a beaded or offset portion, and a series of angularly arranged braces extending across the angle between the rib part and the base part.

23,271 of 1906.—J. JOHNSON and J. TITLEY: *Composition for use as a Binding Medium for Stones and the like.*

This relates to a composition for use as a binding medium for stones and the like used in the construction of roads and concrete, and for use for analogous purposes, consisting of clunch or pit-mound clay or other clay, pitch, and tar.

23,450 of 1906.—H. KELWAY-BAMBER: *Manufacture of Portland and like Cements.*

This consists in regulating the setting time of Portland and like cements by supplying water in the form of fine spray or drops to the cement in a tube-mill or other suitable mill while the mill is working, so as thoroughly and evenly to mix the cement and water together.

10,532 of 1907.—DR. B. ALEXANDER-KATZ: *Process and Apparatus for Manufacturing Artificial Stones.*

This relates to a process for the manufacture of artificial stone from fibrous materials and hydraulic binding agents, which is characterised by the fact that the mixture of asbestos and hydraulic binding agents by the use of small quantities of water is periodically fed into the filter mould working with suction hydro-extraction, and terminated on the one side by an endless filtering cloth and a sheet metal sieve.

MEETINGS.

FRIDAY, NOVEMBER 22.

Glasgow Architectural Craftsmen's Society.—Mr. J. C. Bannatyne on "Public Sewers and their Connexions." 8 p.m.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Lectures by Dr. E. P. Manby. 7 p.m.

Camberwell School of Arts and Crafts, Peckham-road, S.E (South London Art Gallery).—Mr. W. Jennings on "The Comparative Advantages of Siphonic Discharge *v.* Flushdown or Washdown Closets." 8 p.m.

SATURDAY, NOVEMBER 23.

Junior Institution of Engineers.—Visit at 10 a.m. to the Royal Arsenal, Woolwich.

MONDAY NOVEMBER 25.

Surveyors' Institution.—Mr. Sabin will re-open the discussion, adjourned from 18th March last, on the Paper read by Mr. Aubrey J. Spencer on 25th February, entitled "The Agricultural Holdings Act, 1906." 8 p.m.

Society of Arts (Cantor Lectures).—"The Theory of the Microscope"—I., by Mr. Conrad Beck, F.R.M.S. 8 p.m.

TUESDAY, NOVEMBER 26.

Institute of Sanitary Engineers.—Mr. A. J. Martin on "Scavenging and Disposal of Refuse." 7 p.m.

Institution of Civil Engineers.—Mr. S. H. Ellis on "The Tranmere Bay Development Works." 8 p.m.

WEDNESDAY, NOVEMBER 27.

Northern Architectural Association (Students' Meeting).—Mr. J. Bruce on "Some Constructional Problems." 7.30 p.m.

Society of Arts.—"The Franco-British Exhibition, 1908," by the Hon. Sir John A. Cockburn, K.C.M.G. 8 p.m.

Edinburgh Architectural Association (Associates' Meeting).—Mr. F. H. Lightbody on "The Estimate of Probable Cost." 8 p.m.

THURSDAY, NOVEMBER 28.

Builders' Benevolent Institution.—The 60th Annual Dinner, Whitehall Rooms, Hôtel Métropole. 6.30 p.m.

Institution of Electrical Engineers.—Dr. Robert Pohl on "The Development of Turbo-Generators." 8 p.m.

FRIDAY, NOVEMBER 29.

Royal Sanitary Institute (Provincial Sessional Meeting, Leeds).—The meeting will be held in the Council Chamber, Town Hall, Leeds, at 7.30 p.m., when a discussion will take place on "Modern Methods of Sewage Disposal, with special reference to the Elimination of Suspended Matters," to be opened by Mr. G. A. Hart, Sewerage Engineer, Leeds.

Society of Arts (Shaw Lectures on Industrial Hygiene).—"The Hygiene of Work in Compressed Air (Diving, Caisson Work, Sub-aqueous Tunnelling, etc.)," by Mr. J. Scott Haldane, M.A., M.D., M.R.C.P. (Edin.), F.R.S. Mr. H. L. Samuel, M.P., Under-Secretary of State for the Home Department, will preside, and will give a short introductory address. 8 p.m.

FRIDAY AND SATURDAY, NOVEMBER 29 AND 30.

Institute of Sanitary Engineers.—Examination in Sanitary Science at London and Newcastle. 10 a.m.

SATURDAY, NOVEMBER 30.

Royal Sanitary Institute (Leeds Meeting).—Visit to Headingly filter-beds, by permission of the Waterworks Committee. From the works to proceed by special cars to Rodley to visit the sewage installation. A visit to the city hospitals at Seacroft and Killingbeck will be made later.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

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Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

November 11.—By J. GRIFFIN & SON.

Ealing.—The Avenue, f.g. rents 31*l.*, reversion in 78 yrs.	£880
Chelsea.—11, Halsey-st., f., y.r. 70*l.*	900
Harrow Road.—No. 552 (s.), u.t. 71 yrs., g.r. 8*l.*, y.r. 95*l.*	1,200

By POOLER & DAVIES (at Newport).

Adbaston, Stafford.—Adbaston Grange, 79 a. 2 r. 28 p., f.	3,350

November 12.—By DAVID BURNETT, SON, & BADDELEY.

Finchley.—Bow-la., f.g. rents 31*l.*, reversion in 97 yrs.	735

By HENRY H. COLLIER & MADGE.

Hanwell.—Elthorne Park-rd., f.g. rents 22*l.* 10s., reversion in 91 yrs.	500

By DEBENHAM, TEWSON, RICHARDSON, & CO.

Borough.—202, Borough High-st. (s.), f., y.r. 65*l.*	1,430

By MARK LIELL & SON.

Stepney.—40, White Horse-la. (s.), f., y.r. 25*l.*	245

By MERRETTS.

Fulham.—13, Elmstone-rd., u.t. 83 yrs., g.r. 6*l.* 6s., y.r. 40*l.*	460

By E. M. THOMAS & CO.

Battersea.—38 and 40, Sterndale-rd., u.t. 56 yrs., g.r. 6*l.* 15s., w.r. 67*l.* 12s.	400

By DREWEATT & WATSON (at Newbury).

Newbury, Berks.—Donnington-rd., The Firs, 4 a., f., p.	3,000
The Market-pl., freehold business premises, 4,374 ft., p.	3,400

By DOLMAN & PEARCE (at Camden Town).

Gospel Oak.—24, 26, 28, and 30, Rochford-st., u.t. 42 yrs., g.r. 28*l.*, y.r. 136*l.*	1,015
Chalk Farm.—42 and 44, Crogsland-rd., u.t. 59 yrs., g.r. 16*l.*, y.r. 104*l.*	855
Regent's Park.—73, Gloucester-rd. (s.), u.t. 45 yrs., g.r. 10*l.*, y.r. 48*l.*	335

By C. G. RIGHTON & SON (at Bidford).

Marlcliff, Warwick.—Three enclosures of land, 31 a. 0 r. 30 p., f.	1,020

November 13.—By HAROLD GRIFFIN.

Battersea.—104, 106, and 108, Usk-rd., u.t. 56 yrs., g.r. 2*l.* 10s., w.r. 63*l.* 14s.	430
60, 62, and 64, Bridge-rd. West, u.t. 15½ yrs., g.r. nil, w.r. 85*l.* 16s.	240
44, Church-rd., u.t. 55 yrs., g.r. 3*l.* 2s., w.r. 31*l.* 4s.	195

By MANSELL & ROWE.

Norwood.—40, Alexandra-rd., u.t. 49 yrs., g.r. 3*l.* 10s., e.r. 45*l.*, and plot of land, g.r. nil.	250

By ARTHUR SINGLE.

Stratford.—Town Hall Chambers, u.t. 50 yrs., g.r. 100*l.*, y. and e.r 395*l.*	1,530

By TROLLOPES.

Westminster.—128, Victoria-st., u.t. 15 yrs., g.r. 7*l.* 10s., p.	1,400

November 14.—By P. J. DIXON & SON.

Plaistow.—6, Junction-rd., f., w.r. 24*l.* 14s.	185
Bethnal Green.—58 to 76 (even), Temple-st., f., w.r. 273*l.*	2,295
Leyton.—111 to 129 (even), Sidmouth-rd., f., w.r. 156*l.*	1,000
Walthamstow.—53 to 71 (odd), Grange-rd., u.t. 75 yrs., g.r. 40*l.*, w.r. 182*l.*	800
Hackney.—29 to 63 (odd), Percy-rd., f., w.r. 453*l.* 14s.	4,300
Bethnal Green.—14 and 16, Ames-st., f., w.r. 54*l.* 12s.	500
Whitechapel.—13 and 15, Brady-st. (s.), u.t. 263 yrs., g.r. nil, w.r. 67*l.* 12s.	£610
Shoreditch.—14, 15, 19, and 20, New Inn-st., f., w.r. 91*l.*	750
Mile End.—36 to 46, Ann-st., f., w.r. 191*l.* 2s.	1,700
Bromley-by-Bow.—21 and 23, 25 and 27, Priory-st., and yard adjoining, f., w.r. 104*l.*	1,040

By H. J. BLISS & SONS.

Charlton.—83 to 93 (odd), East-st., f., w.r. 115*l.* 14s.	600

By CHESTERTON & SONS.

Brixton.—145 to 151 (odd), Railton-rd., u.t. 61 yrs., g.r. 22*l.*, w.r. 208*l.*	1,070

By NEWBON, SHEPHARD, & EDWARDS.

Streatham.—Leigham Vale, f.g.r. 70*l.* 5s., reversion in 77 yrs.	1,760
City Road.—74, Westmoreland-pl., f., y.r. 26*l.*	220
Highgate.—35, North Hill, f., y.r. 45*l.*	700
9, Wood-la., u.t. 58½ yrs., g.r. 7*l.* 10s., y.r. 45*l.*	360
12, North-rd. (s.), u.t. 27½ yrs., g.r. 10*l.* 10s., y.r. 45*l.*	275
16, North-rd. (s.), u.t. 26 yrs., g.r. 6*l.*, y.r. 90*l.*	560
36, North Hill, u.t. 7½ yrs., g.r. 6*l.*, y.r. 55*l.*	100
96 to 108, North Hill, u.t. 3 yrs., g.r. 12*l.*, w.r. 182*l.*	105

November 15.—By LINNETT & LANE.

Harlesden.—76 and 78, High-st. (s.), u.t. 94 yrs., g.r. 55*l.*, y.r. 235*l.*	1,855

By REYNOLDS & EASON.

St. John's Wood.—47, Loudoun-rd., u.t. 50 yrs., g.r. nil, e.r. 65*l.*	345

Contractions used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum, and Canada 21s. 8d. (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 26s. per annum.

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PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.	
Hard Stocks	1	7	0	per 1000 alongside, in river.
Rough Stocks and Grizzles	1	6	0	" " "
Picked Stocks for Facings	2	10	0	" delivered.
Flettons	1	6	0	" at railway depôt.
Red Wire Cuts	1	14	0	" " "
Best Fareham Red	3	12	0	" " "
Best Red Pressed Ruabon Facing	5	0	0	" "
Best Blue Pressed Staffordshire	3	15	0	" "
Do. Bullnose	4	0	0	" " "
Best Stourbridge Fire Bricks	3	14	0	" " "

GLAZED BRICKS.

Best White and Ivory Glazed Stretchers	12	0	0	" " "
Headers	11	0	0	" " "
Quoins, Bullnose, and Flats	16	0	0	" " "
Double Stretchers	19	0	0	" " "
Double Headers	16	0	0	" " "
One Side and two Ends	19	0	0	" " "
Two Sides and one End	20	0	0	" " "
Splays, Chamferred, Squints	20	0	0	" " "
Best Dipped Salt Glazed Stretchers, and Header	12	0	0	" " "
Quoins, Bullnose, and Flats	14	0	0	" " "
Double Stretchers	15	0	0	" " "
Double Headers	14	0	0	" " "
One Side and two Ends	15	0	0	" " "
Two Sides and one End	15	0	0	" " "
Splays, Chamferred, Squints	14	0	0	" " "
Second Quality White and Dipped Salt Glazed	2	0	0	" less than best.

	s.	d.	
Thames and Pit Sand	7	0	per yard, delivered.
Thames Ballast	5	6	" "
Best Portland Cement	30	0	per ton, "
Best Ground Blue Lias Lime	19	6	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks	27s. 0d. per ton at rly. dpt.

STONE.

	s.	d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1	6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1	8½	" "
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2	1	" "
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2	2½	" "

	s.	d.		
Ancaster in blocks	1	10	per ft. cube, deld. rly. depôt.	
Beer "	1	6	"	"
Greenshill "	1	10	"	"
Darley Dale in blocks	2	4	"	"
Red Corsehill "	2	2	"	"
Closeburn Red Freestone	2	0	"	"
Red Mansfield "	2	4	"	"

YORK STONE—*Robin Hood Quality.*

Scappled random blocks	2	10	"	"
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3	per ft. super.,	"
6 in. rubbed two sides ditto, ditto	2	6	"	"
3 in. sawn two sides slabs (random sizes)	0	11½	"	"
2 in. to 2½ in. sawn one side slabs (random sizes)	0	7½	"	"
1½ in. to 2 in. ditto, ditto	0	6	"	"

HARD YORK—

Scappled random blocks	3	0	per ft. cube	"
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	8	per ft. super.	"
6 in. rubbed two sides ditto	3	0	"	"
3 in. sawn two sides slabs (random sizes)	1	2	"	"
2 in. self-faced random flags	0	5	"	"

SLATES.

In. In.	£	s.	d.	
20×10 best blue Bangor	13	2	6	per 1000 of 1200 at r. d.
20×12 " "	13	17	6	" "
20×10 first quality "	13	0	0	" "
20×12 " "	13	15	0	" "
16×8 " "	7	5	0	" "
20×10 best blue Portmadoc	12	12	6	" "
16×8 " "	6	12	6	" "
20×10 best Eureka unfading green	15	17	6	" "
20×1 " "	18	7	6	" "
18×10 " "	13	5	0	" "
16×8 " "	10	5	0	" "
20×10 permanent green	11	12	6	" "
18×10 " "	9	12	6	" "
16×8 " "	6	12	6	" "

TILES.

	s.	d.	
Best plain red roofing tiles	42	0	per 1000 at rly. depôt.
Hip and Valley tiles	3	7	per doz. "
Best Broseley tiles	50	0	per 1000 "
Do. Ornamental tiles	52	6	" "
Hip and Valley tiles	4	0	per doz. "
Best Ruabon red, brown, or brindled do. (Edwards)	57	6	per 1000 "
Do. Ornamental do.	60	0	" "
Hip tiles	4	0	per doz. "
Valley tiles	3	0	" "
Best Red or Mottled Staffordshire do. (Peakes)	51	9	per 1000 "
Do. Ornamental do.	54	6	" "
Hip tiles	4	1	per doz. "
Valley tiles	3	8	" "
Best "Rosemary" brand plain tiles	48	0	per 1000 "
Best Ornamental tiles	50	0	" "
Hip tiles	4	0	per doz. "
Valley tiles	3	8	" "
Best "Hartshill" brand plain tiles, sand-faced	50	0	per 1000 "
Do. pressed	47	6	" "
Do. Ornamental do.	50	0	" "
Hip tiles	4	0	per doz. "
Valley tiles	3	6	" "

WOOD.

BUILDING WOOD.	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13	10	0	... 15	0	0
Deals: best 3 by 9	13	0	0	... 14	0	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	0	0	... 12	0	0
Battens: best 2½ by 6 and 3 by 6	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less than best.		
Battens: seconds	0	10	0	" "		
2 in. by 4 in. and 2 in. by 6 in.	9	0	0	... 10	0	0
2 in. by 4½ in. and 2 in. by 5 in.	8	10	0	... 9	10	0
Foreign Sawn Boards—1 in. and 1¼ in. by 7 in.	0	10	0	more than battens.		
¾ in.	1	0	0	"		
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 4	10	0	... 5	0	0
Seconds	4	0	0	... 4	10	0
Small timber (8 in. to 10 in.)	3	12	6	... 3	15	0
Small timber (6 in. to 8 in.)	3	0	0	... 3	10	0
Swedish balks	2	10	0	... 3	0	0
Pitch-pine timber (30 ft. average)	4	0	0	... 4	15	0

JOINERS' WOOD.	At per standard. £	s.	d.	£	s.	d.
White Sea: first yellow deals, 3 in. by 11 in.	24	0	0	... 25	0	0
3 in. by 9 in.	22	0	0	... 23	0	0
Battens, 2½ in. and 3 in. by 7 in.	16	10	0	... 18	0	0
Second yellow deals, 3 in. by 11 in.	18	10	0	... 20	0	0
" " 3 in. by 9 in.	17	10	0	... 19	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	... 14	10	0
Third yellow deals, 3 in. by 11 in. and 9 in.	13	10	0	... 15	0	0
Battens, 2½ in. and 3 in. by 7 in.	11	0	0	... 12	0	0

WOOD (*continued*).

JOINERS' WOOD (*continued*)—	At per standard. £ s. d.	£ s. d.
Petersburg first yellow deals, ⅞ in. by 11 in.	21 0 0	22 10 0
Do. 3 in. by 9 in.	18 0 0	19 10 0
Battens	13 10 0	15 0 0
Second yellow deals, 3in. by 11in.	16 0 0	17 0 0
Do. 3 in. by 9 in.	14 10 0	16 0 0
Battens	11 0 0	12 10 0
Third yellow deals, 3 in. by 11 in.	13 0 0	14 0 0
Do. 3 in. by 9 in.	12 10 0	14 0 0
Battens	10 0 0	11 0 0
White Sea and Petersburg—		
First white deals, 3 in. by 11 in.	14 10 0	15 10 0
" 3 in. by 9 in.	13 10 0	14 10 0
Battens	11 0 0	12 0 0
Second white deals, 3 in. by 11 in.	13 10 0	14 10 0
" " 3 in. by 9 in.	12 10 0	13 10 0
" " battens	10 0 0	11 0 0
Pitch-pine: deals	18 :0	21 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—First, regular sizes	44 0 0	upwards.
Oddments	32 0 0	"
Seconds, regular sizes	33 0 0	"
Yellow Pine oddments	28 0 0	"
Kauri Pine—Planks, per ft. cube	0 3 6	0 5 0
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 3 0	0 3 6
Small " "	0 2 6	2 9
Wainscot Oak Logs, per ft. cube	0 5 6	0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8½	0 0 9½
¼ in. do. do	0 0 7	—
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 9	0 1 0
Selected, Figury, per ft. super. as inch	0 1 6	0 2 6
Dry Walnut, American, per ft. super. as inch	0 0 10	0 1 0
Teak, per load	17 0 0	22 0 0
American Whitewood Planks, per ft. cube	0 4 0	0 5 0
Prepared Flooring, etc.—	Per square.	
1 in. by 7 in. yellow, planed and shot	0 13 6	0 17 6
1 in. by 7 in. yellow, planed and matched	0 14 0	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0	0 16 6
⅞ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	0 13 6
1 in. by 7 in. " "	0 14 0	0 18 0
⅞ in. by 7 in. white " "	0 10 0	0 11 6
1 in. by 7 in. " "	0 12 9	0 15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	7 15 0	8 5 0
Compound Girders, ordinary sections	10 0 0	11 0 0
Steel Compound Stanchions	12 10 0	13 10 0
Angles, Tees, and Channels, ordinary sections	9 15 0	10 15 0
Flitch Plates	9 15 0	10 15 0
Cast Iron Columns and Stanchions including ordinary patterns	8 0 0	9 0 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON—		
Common Bars	8 10 0	9 0 0
Staffordshire Crown Bars, good merchant quality	9 5 0	9 15 0
Staffordshire "Marked Bars"	11 0 0	—
Mild Steel Bars	9 10 0	9 15 0
Hoop Iron, basis price	9 15 0	10 0 0
" " Galvanised	17 10 0	—
("And upwards, according to size and gauge.)		
Sheet Iron Black—		
Ordinary sizes to 20 g.	10 0 0	—
" " 24 g.	11 0 0	—
" " 26 g.	12 10 0	—
Sheet Iron, Galvanised, flat, ordinary quality—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	16 0 0	—
Ordinary sizes to 22 g. and 24 g.	16 10 0	—
" " 26 g.	17 0 0	—
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes to 20 g.	19 0 0	—
" " 22 g. and 24 g.	19 10 0	—
" " 26 g.	21 0 0	—
Galvanised Corrugated Sheets—		
Ordinary sizes 6 ft. to 8 ft. 20 g.	16 0 0	—
" " 22 g. and 24 g.	16 5 0	—
" " 26 g.	17 10 0	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	13 0 0	—
Best Soft Steel Sheets, 22 g. & 24 g.	14 0 0	—
" " 26 g.	16 0 0	—
Cut Nails, 3 in. to 6 in.	10 15 0	11 5 0
(Under 3 in., usual trade extras.)		

LEAD, &c.

	Per ton, in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 3lb. and up.	21 10 0	—
Pipe in coils	22 0 0	—
Soil pipe	24 10 0	—
Compo pipe	25 10 0	—
ZINC—Sheet—		
Vieille Montagne ton	29 0 0	—
Silesian	28 15 0	—
COPPER—		
Strong Sheet per lb.	0 1 4	—
Thin " "	0 1 5	—
Copper nails "	0 1 3	—

LEAD, &c. (*continued*).

	Per ton, in London. £ s. d.	£ s. d.
BRASS—		
Strong Sheet per lb.	0 1 2	—
Thin " "	0 1 3	—
TIN—English Ingots "	0 1 5	—
SOLDER—Plumbers' "	0 0 8	—
Tinmen's "	0 0 10	—
Blowpipe "	0 1 0	—

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	1⅝d. " "
21 oz. thirds	3¼d. " "
" fourths	2⅛d. " "
26 oz. thirds	4¼d. " "
" fourths	3¼d. " "
32 oz. thirds	5d. " "
" fourths	4¼d. " "
Fluted Sheet, 15 oz.	3¼d. " "
" 21 oz.	4¼d. " "

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

⅛ Hartley's	2½d. per ft. delivered
¼ "	2½d. " "
½ "	3d. " "
Figured and Oxford Rolled "Oceanic" Glass, white	4d. " "
Do. " tinted	5½d. " "

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 2 3
" " " in barrels	"	0 2 4
" " " in drums	"	0 2 5
Boiled " " in pipes	"	0 2 4
" " " in barrels	"	0 2 5
" " " in drums	"	0 2 6
Turpentine in barrels	"	0 3 0
" in drums	"	0 3 2
Genuine Ground English White Lead	per ton	26 10 0
Red Lead, Dry	"	25 10 0
Best Linseed Oil Putty	per cwt.	0 7 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

*** Denotes *accepted.* † Denotes *provisionally accepted.***

BANSTEAD.—For additional day-room accommodation, Bansted Asylum, for the London County Council:—

E Lawrance & Sons	£1,384 0 0	J. Greenwood, Ltd.	£1,209 0 0
Foster & Dicksee	1,336 0 0	Wiles & Sons	1,178 4 1
Holliday & Greenwood	1,333 0 0	J. B. Potter	1,071 6 1
Lovatt, Ltd.	1,331 0 0	F. & H.F. Higgs	1,048 0 0
H. L. Holloway	1,325 0 0	Leslie & Co. Ltd., London*	1,031 0 0
Patman & Fotheringham	1,284 0 0		

BILSTON.—For new schools, "Holy Trinity" (R.C.), Queen-street, for the Managers. Mr. J. P. Baker, architect, 33, Market-place, Willenhall. Quantities by architect:—

H.T. Marchant	£2,594 19 8	Hammonds Bros.	£2,326 0 0
L. Jones	2,589 0 0	C. Griffiths	2,277 0 0
R. Speake & Sons	2,540 0 0	J. Guest & Son	2,230 0 0
W. Wistance	2,510 0 0	H. J. E. Tooley	2,223 0 0
J. Herbert	2,472 0 0	J. Hicken & Sons, Rosehill, Willenhall*	2,222 0 0
J. M. Tildesley	2,440 0 0	A. J. Jordan	2,193 0 0
G. Cave & Son	2,430 0 0		
T. Tildesley	2,415 0 0		
T. & S. Ham	2,397 0 0		
H. Gough & Son	2,360 0 0		

BLYTH.—For kerbing, flagging, etc., Freehold-street, for the Urban District Council. Mr. R. Grieves, Engineer and Surveyor to the Council:—

J. Crombie & Sons	£130 12 9	J. Robson, Newcastle-on-Tyne*	£109 16 9
J. McLaren	116 6 1		
M. McKinnon	116 1 2		

BRAFFERTON.—For sewerage works (Contract A, amended scheme), for Easingwold Rural District Council. Messrs. Fairbank & Son, Engineers, Lendal Chambers, York:—

E. Moorey, Helperby, York..... £115 9 7

CHERITON.—For levelling, metalling, paving, kerbing, drainage, etc., Park-road, for the Urban District Council. Mr. A. O. Shenen, A.M.I.C.E., Surveyor to the Council:—

W. H. Hill, Brunswick Drive, Skegness £697 7 4

CLAYGATE.—For making-up roads, for the Urban District Council of Esher and the Ditton. Mr. Horace C. Fread, Surveyor to Council:—

T. Adams	£419	Kavanagh & Co., Surbiton*	£377
Ingram & Co.	418		
Free & Sons	410		

COLWALL.—For sewerage works, for Ledbury Rural District Council. Mr. R. G. Gurney, Surveyor, Ledbury. Quantities by Surveyor:—

Johnson Bros.	£341 0 0	J. & A. Brazier	£316 0 0
T. W. McCann	335 0 0	W. James, Colwall*	269 13 7
J. A. Meredith	334 0 0	W. Westwood	268 8 0
H. Cooper	320 0 0		

CONWAY.—For Cowlyd new main, for Conway and Colwyn Bay Joint Water Supply Board. Mr. T. B. Farrington, Engineer, Trinity-square, Llandudno:—

A. H. Clark	£43,959 14 9	Bell & Sons, Ltd.	£37,745 12 5
Tate & Gordon	40,619 0 0	W. Hill & Co.	27,475 0 0
I. Dean & Co.	39,726 1 6	Johnson Bros.	27,149 0 0
G. Law	35,999 0 0	R. Allen	26,164 17 0
T. Smart	35,999 0 0	Firth & Co.	25,804 15 2
R. W. Blackwell & Co.	35,000 0 0	R. C. Crawford	24,500 0 0
J. Moffatt	30,476 3 0	H. E. Buckley	24,254 19 3
E. Nuttal & Co.	30,350 7 11	R. C. Brebner & Son	23,665 10 0
F. Mitchell & Son	28,563 12 0	W. Underwood & Bro., Dukinfield*	23,237 16 10
W. M. Rowell & Sons	28,112 16 6		
J. Graham	27,994 17 0		
J. T. Jones	27,826 0 0		

DARTFORD.—For the construction of Bank-court, and Plough-court (north and south sides), for the Urban District Council. Mr. T. E. Tiffin, Assoc.M.Inst.C.E.:—

W. Wilson, Ramsgate* £364 6 9

DARTMOUTH.—For erecting a house and boundary walling at Mount Boone, for Mr. J. Stephens. Mr. W. Percy Marr, A.R.I.B.A., Dartmouth. No bill of quantities:—

R. T. Pillar	£1,012	Watts & Back	£865
Maunder	880	E. Wills & Sons, Strete, near Dartmouth*	829
A. E. Knight	875		
Triggs & Pillar	874		

FRASERBURGH.—For erecting two half-houses, Albert-street. Mr. W. S. F. Wilson, architect, Broadstreet Fraserburgh:—

Mason: J. Rollo	£357 10
Carpenters: Brebner & Jenkins	237 0
Slater: S. Stephens	42 0
Plumbers: Ferguson & Co.	65 0
Painter: J. Stuart	25 0
Plasterer: W. Macdonald	66 0

[All of Fraserburgh.]

HAMPSTEAD.—For a pair of semi-detached houses. Mr. J. E. Henderson, architect, 30, Watling-street, Queen Victoria-street, London, E.C.:—

J. T. Hatchman	£1,729	A. J. Reynolds, Hampstead‡	£1,289
W. & T. Cooper	1,296		

‡Recommended for acceptance.

LEYLAND.—For the construction of precipitation tanks, chambers, conduits, roadways, subsoil drainage, and other works at the sewage farm, for the Urban District Council:—

Edmundson & Wayall, Werneth, Oldham, £2,566

LLANDILO.—For supplying and laying 200 yds. of electric light cable and for four lamps, for the Urban District Council:—

D. Pritchard Davies, Electrician, Llandilo* £69 5 0

LLANISHEN.—For erecting a lodge, also stable buildings and motor-house, for Mr. W. Lloyd. Mr. G. E. Halliday, F.R.I.B.A., 19, Castle-street, Cardiff:—

J. Gibson	£1,640 0 0	Melhuish Bros.	£1,404 0 0
W. Jones	1,627 4 11	T. F. Howells	1,404 0 0
Cox & Burdo	1,547 0 0	E. Turner & Sons	1,396 0 0
Knose & Wells	1,525 0 0	W. H. Gay	1,380 0 0
Blacker Bros.	1,509 0 0	D. Davies	1,284 0 0
J. Allen & Sons	1,485 0 0	C. Totterdell, 20, Tresillian-terrace, Cardiff*	1,241 4 6
E. D. W. Evans	1,457 1 7		
J. Hallett	1,453 0 0		
G. Beams	1,444 0 0		

LONDON.—For a school for the accommodation of about 1,100 children, adjoining the "Southfield" school Wandsworth, for the London County Council:—

[The Board of Education have approved finished plans of a three-story building, designed as a complete school, to accomodate 352 boys, 352 girls, and 412 infants.]

G. Parker	£21,245 0 0
A. S. Ingleton	20,863 18 8
J. Garrett & Son	20,037 0 0
McCormick & Sons	19,219 0 0
J. Appleby & Sons	19,215 0 0
W. Johnson & Co., Ltd.	18,991 0 0
W. Wallis	18,957 17 1
Treasure & Son	18,884 0 0
J. Grover & Son	18,683 0 0
C. Wall, Ltd.	18,676 0 0
D. W. Davies	18,662 2 2
B. E. Nightingale	18,643 0 0
J. Smith & Sons, Ltd.	18,479 0 0
J. & C. Bowyer	18,376 0 0
G. E. Wallis & Sons, Ltd.	18,276 0 0
Waring-White Building Co., Ltd.	18,220 0 0
Holliday & Greenwood, Ltd.	17,992 0 0
T. D. Leng	17,949 0 0
W. E. Davey	17,807 0 0
F. & E. Davey, Ltd.	17,551 3 3
Galbraith Bros.	17,326 13 2
J. & M. Patrick	17,099 0 9
Rowley Bros.	16,612 0 0
A. N. Coles, Town Hall Extension, Chelsea*	16,525 11 5

[The estimate of the Architect (Education), comparable with the tenders, is £18,479.]

LONDON.—For fencing Eaglesfield, Shooter's Hill, for the London County Council:—

A. W. Elwood	£261 12 10	L. Faulkner & Sons	£154 6 2
McVey & Co.	166 15 9	J. Elwell, Phœnix Ironworks, Birmingham*	149 0 0
Bayliss, Jones, & Bayliss, Ltd.	163 17 0		
Hill & Smith	155 10 7		

LONDON.—For alterations and structural additions to 34, Milk-street, City. Mr. Henry A. Saul, A.R.I.B.A., architect, 10, Gray's Inn-square, W.C.:—

Grover & Sons	£746	Mattock & Parsons, 165, Gray's Inn-road, W.C.*	£591
E. Lawrance & Sons	636		
Ashby & Horner	598		

LONDON.—For painting of St. James's Hall, for Westminster City Council:—

Howard & Co.	£160 5	J. R. Sims	£114 0
J. Styles & Son	154 0	H. & E. Lea, Warwick-street*	99 0
Love & Co.	148 0		
W. Wright & Son	135 0		

LONDON.—For Priory-road School for mentally defective children, Kennington, for the London County Council:—

G. E. Everitt	£6,012 0 0
J. & M. Patrick	5,710 0 0
Spencer, Santo, & Co., Ltd.	5,617 14 6
Lathey Bros.	5,536 0 0
W. Downs	5,483 0 0
C. Wall, Ltd.	5,435 14 5
J. Smith & Sons, Ltd.	5,410 0 0
W. Smith & Son	5,406 0 0
R. A. Jewell	5,402 0 0
L. Whitehead & Co., Ltd.	5,255 0 0
W. Akers & Co., Ltd.	5,252 0 0
W. Johnson & Co., Ltd.	5,160 0 0
E. P. Bulled & Co.	5,139 0 0
E. Triggs	5,122 0 0
J. Garrett & Son	5,096 0 0
Galbraith Bros.	4,984 10 11
Rice & Son, 15, Stockwell-road‡	4,937 0 0

‡ Recommended for acceptance.

[The estimate of the Architect (Education), comparable with the tenders, is £5,158.]

LONDON.—For conversion of school for deaf children into school for mentally defective children, Grove-road, Marylebone, for the London County Council:—

C. Wall, Ltd.	£1,818 0 0
McLaughlin & Harvey, Ltd.	1,405 15 5
G. S. S. Williams & Son	1,350 0 0
Staines & Son	1,327 0 0
Marchant & Hirst	1,294 0 0
Waring-White Building Co., Ltd.	1,283 0 0
McCormick & Sons	1,234 0 0
E. Lawrance & Sons	1,228 0 0
Stevens & Sons	1,227 0 0
C. F. Kearley	1,216 0 0
G. Godson & Sons	1,174 0 0
Thompson & Beveridge, 151, Harrow-road*	1,148 0 0

LONDON.—For manual training centre and science room, Thomas-street, Limehouse:—

Perry & Co.	£1,718 0 0
Snewin Bros. & Co.	1,695 0 0
Killby & Gayford, Ltd.	1,686 0 0
C. Wall, Ltd.	1,674 1 10
J. Grover & Son	1,619 0 0
J. Willmott & Sons	1,581 0 0
Thompson & Beveridge	1,567 0 0
F. & T. Thorne	1,563 0 0
E. Lawrance & Sons	1,555 0 0
A. E. Symes	1,529 0 0
J. Chessum & Sons	1,491 2 10
McCormick & Sons	1,476 0 0
W. Lawrence & Son, Waltham-cross*	1,457 0 0

[The estimate of the Architect (Education), comparable with the tenders, is £1,524.]

LUDLOW.—For alterations to the Grammar School, for the Govenors. Mr. Harold Brakspear, F.S.A., architect, Corsham. Quantities by Messrs. Amor & Underwood, Bath:—

H. Willcock & Co.	£3,625	Collins & Godfrey	£2,868
Robersons, Ltd.	3,614	E. Chancellor & Sons	2,860
Bowdler & Co.	3,475	E. Preece	2,857
B. Weale & Son	3,350	Treasure & Son	2,804
E. Whittingham	3,120	T. Broad, Ltd.	2,760
T. Speake	3,000	G. H. Bickerton	2,725
T. Pace	2,996	T. J. Bryan	2,498
H. Smith	2,995	Turford & Southward	2,345
Hayward & Wooster	2,909	Downing & Rudman, Chippenham, Wilts*	2,337
Stephens, Bastow & Co.	2,898		

*Accepted subject to the approval of the Board of Education.

MARCH.—For new abutments and repairs to bridge over the Middle Level main drains. Mr. A. Lunn, C.E., Middle Level Offices, March:—

A. Dodman & Co., Ltd.	£469 18 0	Tash & Langley, Kings Lynn *	£270 0 0
R. Shanks	450 0 0		

[Engineer's estimates £300.]

NEWPORT (Mon.).—For altering and widening the Newport and Risca main road, for Monmouthshire County Council Main Roads and Bridges Committee. Mr. W. Tanner, F.S.I., County Surveyor, Newport, Mon. Quantities by Surveyor:—

Contract No. 1.

A. W. Brownscombe, Newport, Mon.	£486 12 11

Contract No. 2.

E. Osmond & Sons, Cardiff	2,744 15 4

Contract No. 3.

H. C. Parfitt, Newport	2,670 0 0

SALFORD.—For water supply works, for Chipping Norton Rural District Council. Mr. Richard Cooper, Surveyor, Charlbury Oxon:—

Hartwell & Son	£145 0 0	C. East & Son, Burford, Oxon*	£129 17 3
W. N. Rowell	141 15 8		
S. Lewis	130 10 0		

SCUNTHORPE.—For 1,000 yds. of cast-iron pipes, etc., and laying, etc., same, for the Urban District Council. Mr. W. F. Bickford, Engineer and Surveyor, Horne-street Scunthorpe. Quantities by Engineer:—

G. K. Waghorn	£322 12 7	W. H. Temperton	£261 10 8
C. Chamberlain	320 0 0	A. R. Knight	258 11 4
R. C. Brebner & Co.	307 0 0	Egan & Co.	244 9 4
H. E. Buckley	282 10 9	F. & J. Hannay	239 14 11
Woodcock & Riley	278 3 10	Cooper & Berry	225 0 0
J. Clark	266 2 3	H. J. Thompson, Scunthorpe*	210 0 0
Huntsman	262 14 9		

[Engineer's estimate £245 11 2.]

STRETFORD.—For lighting and traction mains, for the Urban District Council:—

W. T. Glover & Co., Ltd.	£4,147 13 1
Callender's Cable & Construction Co., Ltd.	1,258 2 6

TUNBRIDGE WELLS.—For erection of village hall at Lye Green, for Miss Harris. Mr. W. Kirk, architect, Withyham, Tunbridge Wells:—

J. Waters	£525
Connor Bros., Crowborough‡	437

‡ Accepted modified.

WANSTEAD.—For making up Clavering-road, Wanstead Park Estate, for the Urban District Council. Mr. C. H. Bressey, Surveyor, Council Offices, Wanstead, N.E.:—

R. Anstead	£1,250 0 0	J. Jackson	£998 9 11
G. Bell	1,121 0 0	W. & C. French	990 0 0
W. Griffiths	1,071 0 0	Parsons & Parsons	979 0 0
H. Payne	1,066 0 0	F. Barry, Upton Park	915 0 0
W. Manders	1,050 0 0		
E. Parry & Co.	1,048 0 0		
T. Adams	1,042 0 0		

[Surveyor's estimate, £1,006 17 5.]

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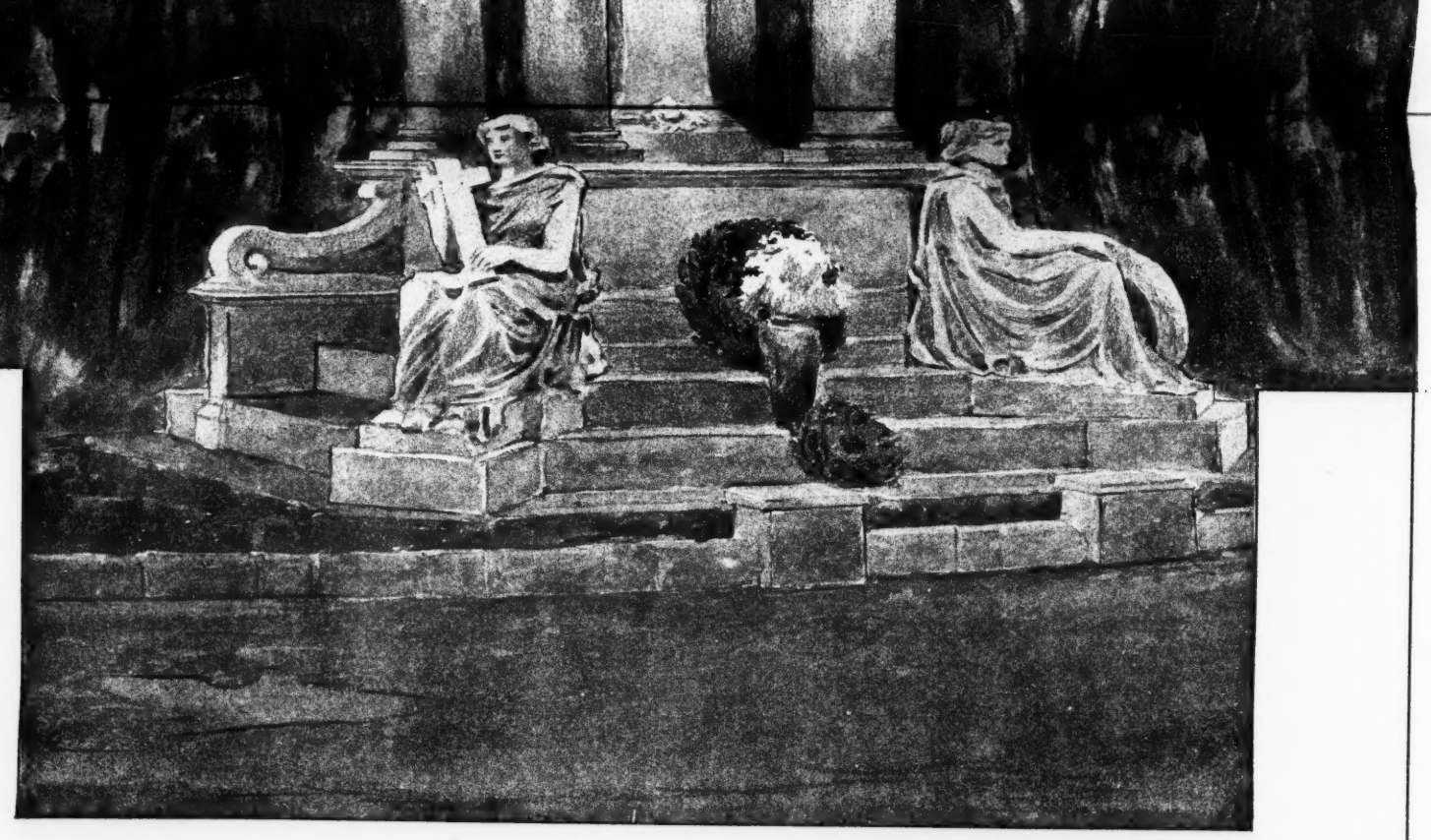

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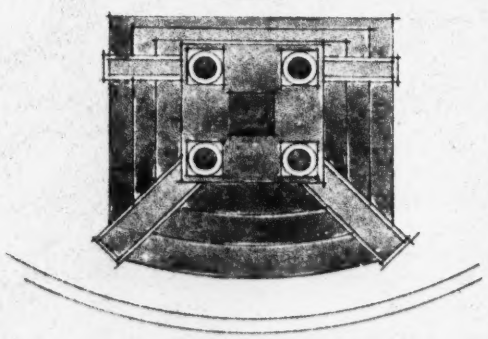

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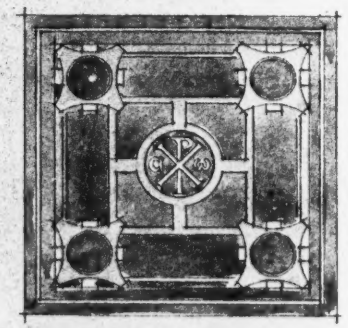

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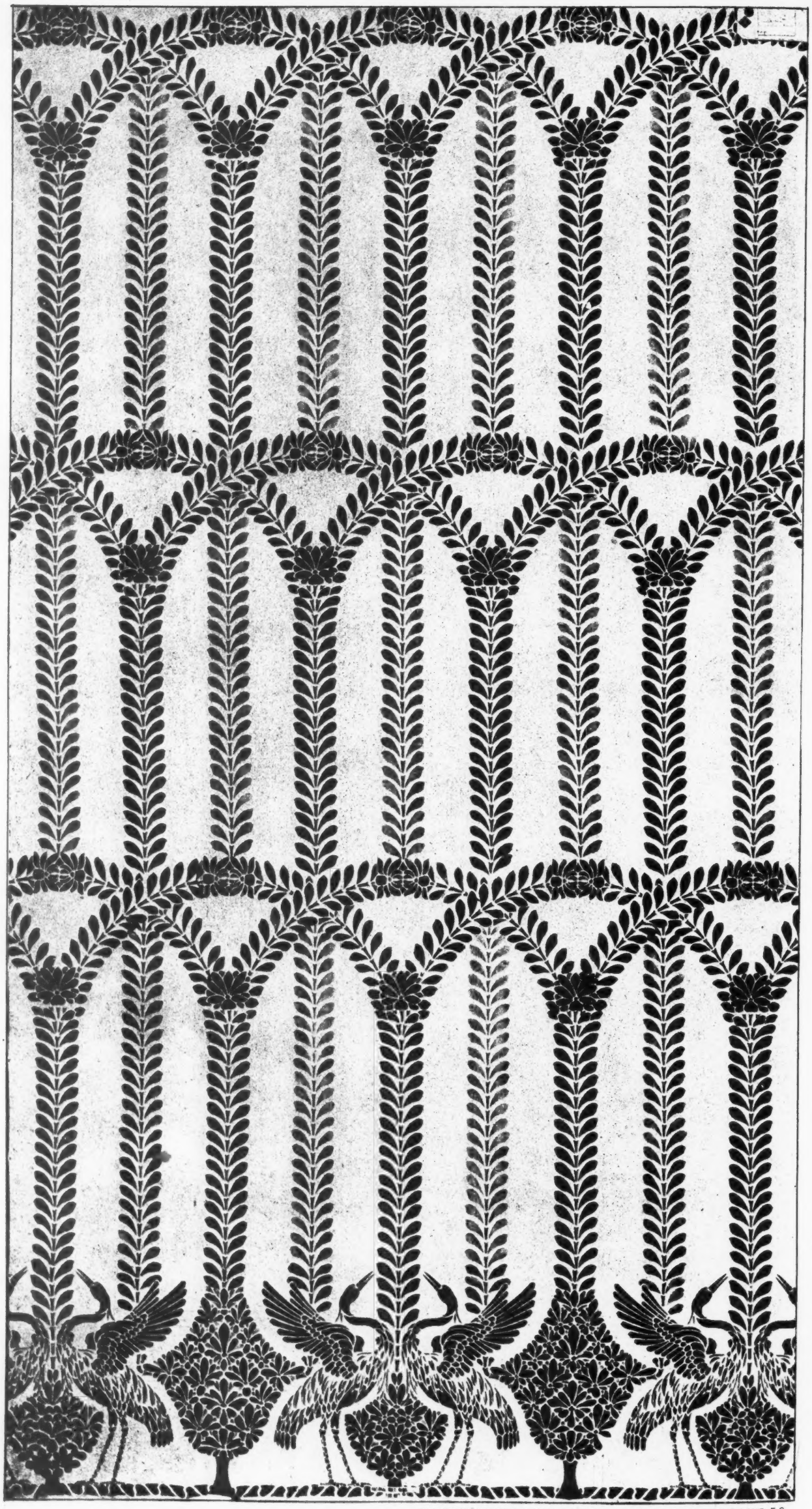

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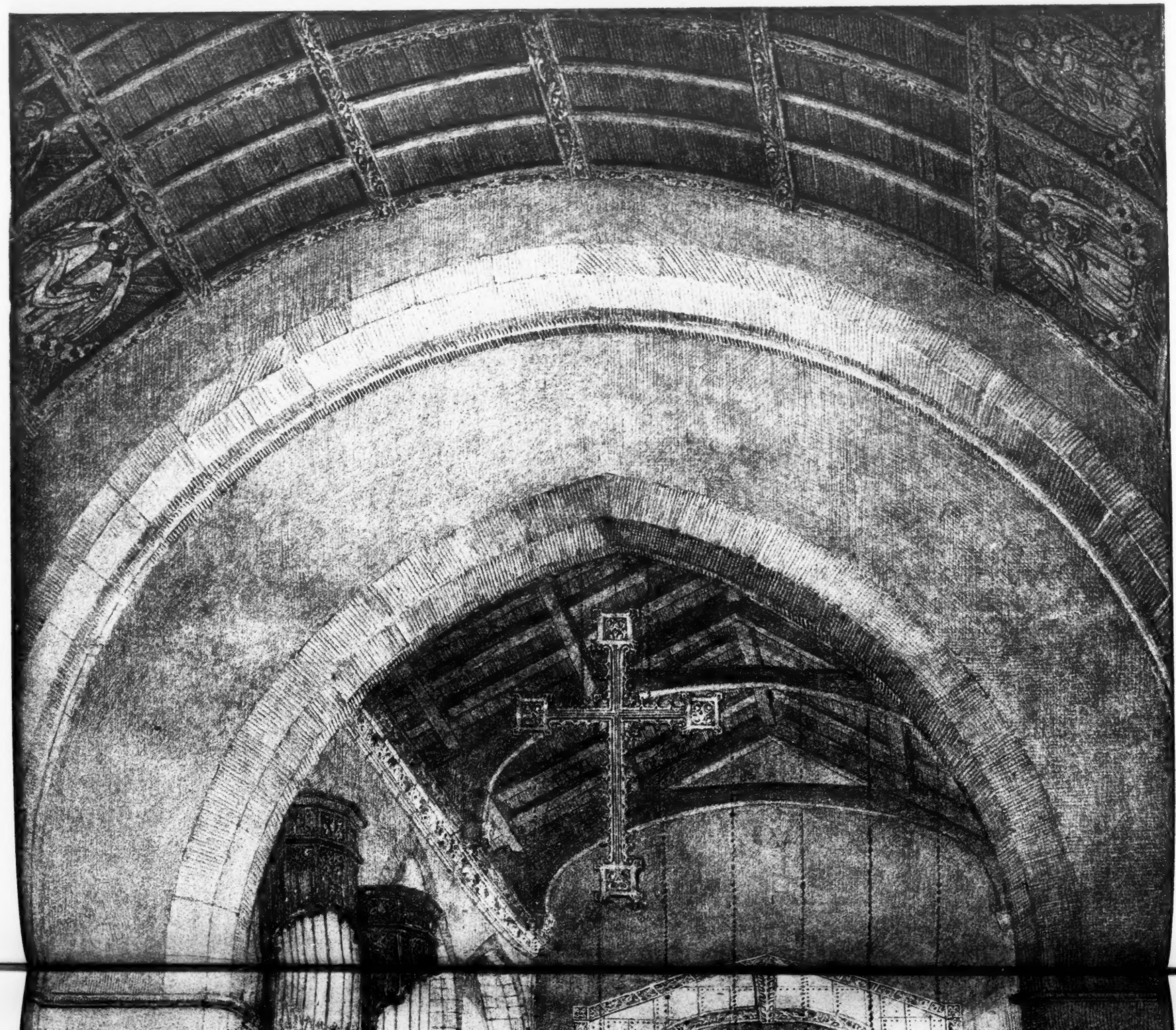

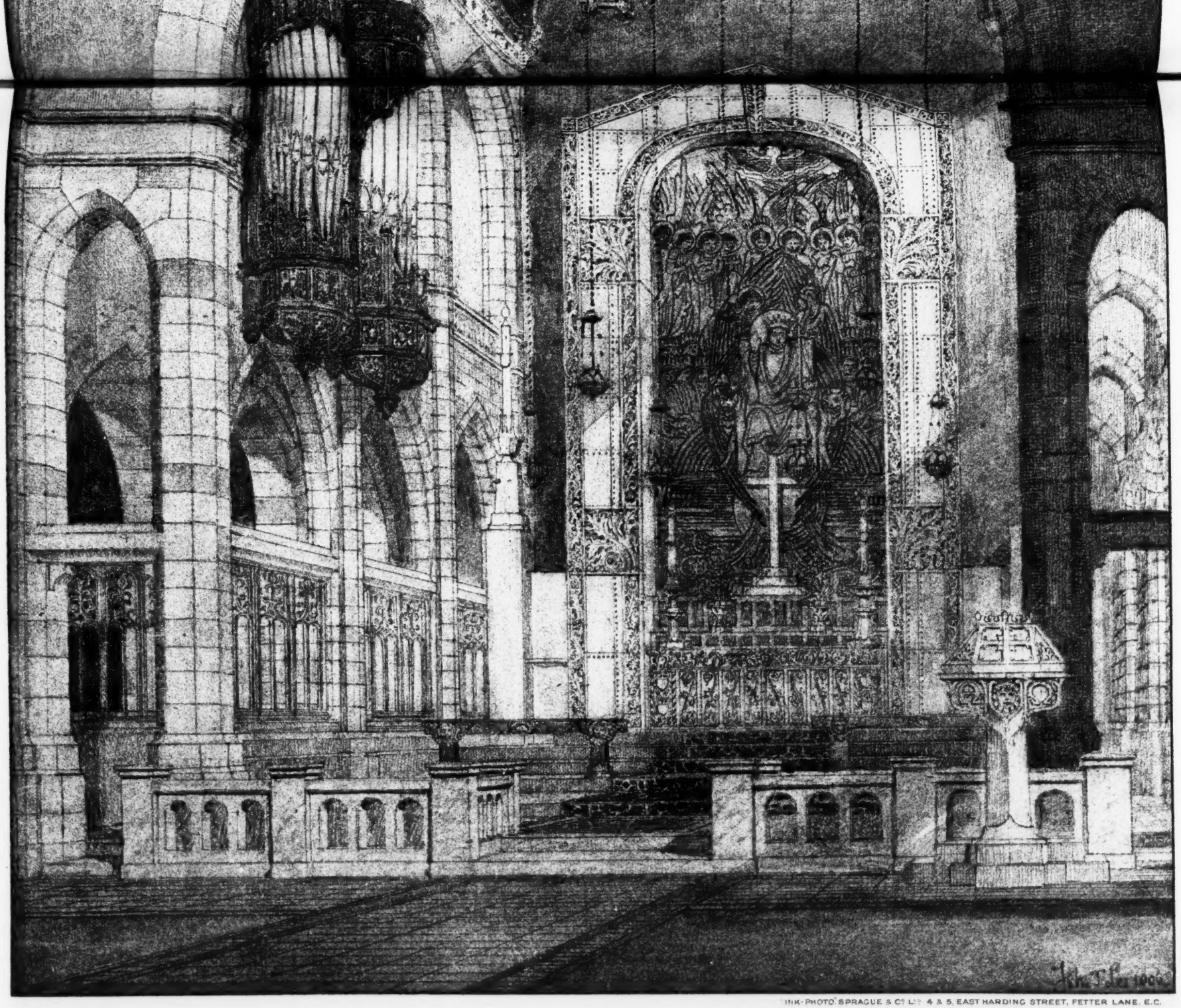

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